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The Medicine of the Babylonians and Assyrians.

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I.

HIPPOCRATES, as you are aware, introduces his aphorisms—or must we say the aphorisms ascribed to Hippocrates—by the famous reflection, "Art is long and time is fleeting." My subject is large, very large, and my time—or rather your time—limited. I must, therefore, resist the temptation of any long introduction, though I cannot forbear expressing my deep appreciation of the honour involved in being asked to address this distinguished company. I would, however, fail in frankness did I not add that my pleasure is tempered somewhat by my diffidence in addressing you on a subject which, to be properly presented, requires the combination of a physician, a botanist, and an Assyriologist.

The situation, however, is characteristic of the interpenetration of fields of research in our days, obliging the student in one field frequently to cross over into an adjacent one, despite the danger-sign "No Trespassing" that may be staring him in the face. The only one warned off by such a sign is the special specialist of the type—so successfully "made in Germany"—who devotes his life to the study of the Dative case in Latin, only to regret on his deathbed that he had not confined himself to the ethical Dative. In the American Cambridge there is a street known as "Divinity Avenue," at the head of which is a sign-post reading ominously "Dangerous Crossing." You read the sign carefully, and then cross as the only means of getting to your goal.

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The student of history is constantly obliged to cross over into the domain of law, economics, and military strategy. The philosopher who has a message encroaches on what the theologian is accustomed to regard as his province. Modern medicine is closely intertwined with the new chemistry, and when we are dealing with a complex civilization such as that of Ancient Babylonia and Assyria, the student of Assyriology finds himself at a disadvantage in not having the proverbial nine lives of a cat, so as to be also an historian, an economist, a philosopher, a theologian, an astronomer, a chemist, a botanist, a zoologist, and a physician.

With a frank confession that I own to merely one life, and that my knowledge of medicine is the layman's learning, which you will agree with me is usually too little to be even dangerous, I will proceed—to trespass.

II.

Our knowledge of the medicine of the Babylonians and Assyrians is derived almost exclusively from the great library of clay tablets gathered in his palace by King Ashurbanapal of Assyria, who ruled from 668 to 626 B.C., and which was discovered by Sir Austen Henry Layard in 1849 in the course of his excavations at the mound Kouyunjik, opposite Mosul, the site of Nineveh, which was the capital of the later Assyrian Empire. About 30,000 fragments of the clay tablets of the collection, which may well have numbered over 100,000 when complete, have found their way into the world's greatest treasure-house — the British Museum. The term "library" may justly be applied to the collection, for there is scarcely a branch of knowledge that is not in some way, and to some extent, represented. Through the remains we are enabled to form an estimate of the intellectual achievements of both the Babylonians and Assyrians, for although the tablets date from the comparatively late reign of Ashurbanapal, the collection represents for the larger part copies made from older originals by the scribes of the Assyrian king who were sent to the temples in the south to copy the literary remains of the past that had been gathered in the course of many centuries in the archives of Babylonian temples. The largest place in the collection is taken by the religious literature, within which several divisions may be recognized, omens of all kinds, incantations—the latter shading off into prayers, and these unfolding into hymns, myths, and legends, all with a religious background—and we also have the remains of an extensive national epic. The text-book literature, consisting of sign lists and of word lists, of grammatical exercises and of

commentaries to texts, constitutes a second division, while a third is formed by the official correspondence of Ashurbanapal and some of his predecessors, including reports of various kinds made to the rulers.

Included in the collection are also several hundred medical texts—indeed at least 800 fragments may be placed in this category,[1] though, for a reason that will presently become clear, the dividing line between a medical text and an incantation on the one hand, or an omen text on the other, cannot always be sharply drawn. Outside of Kouyunjik very few medical texts have as yet come to light,[2] one of the few specimens it will be my privilege to place before you. No doubt this paucity of medical texts outside of Nineveh is accidental, for the medical section in the royal Assyrian library is clearly of Babylonian origin; and in the course of time large numbers of medical texts must have been gathered in the temples of Babylonia.

We have no definite means of determining the age of the medical tablets from which the scribes of Ashurbanapal made their copies. A general feature of these texts, which holds good, however, for all the other sections of Babylonian-Assyrian literature, is their composite character, containing by the side of later elements much that is far older. It is characteristic in general of the literary productions of the ancient Orient that the old is preserved alongside of the new. The Pentateuchal Codes of the Old Testament may serve as an example, where often in the same chapter very ancient practices, revealing in an unmistakable manner the primitive ideas on which they rest, are incorporated with laws that belong to a far more advanced and later age. So in the medical texts of the royal library we have the accumulated experience of the past combined with the science of the age in which the compilation was made. If dates are desired, one may say in

[1] *See* Bezold's "Catalogue of the Cuneiform Tablets in the Kouyunjik Collection of the British Museum," vol. v, *sub.* "Ceremonies" and "Incantations." At the time that this catalogue—a monument to its learned author and a vast mine of information—was published, it was not possible sharply to differentiate between (*a*) omen texts dealing with abnormal and pathological symptoms on the human body, (*b*) medical texts with magic rites, and (*c*) medical prescriptions with a minimum of incantation formulæ. All three classes are included under the rubrics named. As a consequence it will not be possible to estimate the *exact* number of medical texts in the proper sense contained in the library until after the publication of all the tablets of the three subdivisions.

[2] A few lines from a medical text with magic rites from a tablet in the Constantinople Museum were translated by Scheil in the "Recueil de Travaux relatifs à la Philologie et l'Archæologie Egyptiennes et Assyriennes," xxii, p. 160 *et seq.* The text, as Professor Scheil informs us, is of the Neo-Babylonian period. There are no medical texts, apparently, in the Louvre Museum, but there are two catalogued as such in the University of Pennsylvania collection.

a rough way that the treatment of disease as revealed in the medical text of Ashurbanapal's library must revert to a period of at least 2000 B.C. The proof for this is to be found in the famous code of Hammurapi (a more correct pronunciation than Hammurabi), dating from *circa* 1950 B.C., in which not only the word for physician, *Asu*, signifying "healer," occurs, but where we find included in the portion of the code devoted to injuries the laws in regard to the fees for surgical operations, as well as the fines for fatal errors on the part of the surgeon.[1] No doubt you are familiar with those regulations which, curiously enough, fix the fee in the case of a successful operation according to the station occupied by the patient. The ordinary freeman pays, e.g., for a successful operation on the eye or elsewhere 10 shekels (less than £1), while a member of the ruling class gets a reduction of 50 per cent.; and in case the operation is performed on a slave, the owner of the slave pays 2 shekels. For the setting of a bone or the cure of some internal injury the fee is 5 shekels, which is reduced to 3 shekels if the patient is of higher rank. The punishment for the failure of an operation, on the principle that the physician had no right to take the risk, similarly varies according to the position of the patient. If he be a slave who in consequence of the operation dies, the surgeon is to replace the slave by another; if the slave loses an eye the physician must pay one half of the value of the slave. If, however, it is a freeman who dies as a result of the operation, or if the eye of a freeman is destroyed through the operation, the procedure is quite simple—the physician's hand is cut off.

Such regulations point on the one hand to established medical treatment, but on the other, in the inclusion of surgical operations among "injuries"; and in the attempt to apply the *lex talionis*—the legal *quid pro quo* principle—to medical practice, there is revealed an aspect of medicine distinctly primitive, and which warns us against going too far beyond the time of Hammurapi for the beginnings of medical treatment, except as an accompaniment of incantations and magic rites.

[1] §§ 218-223. The Code was first published by Scheil in vol. iv of the "Mémoires de la Délégation en Perse," Par., 1902, pp. 4-162, since which time an extensive literature has grown around this remarkable document. An English translation in convenient form was published by C. H. W. Johns, "The Oldest Code of Laws in the World," Edinb., 1903. Another edition of the text, with transliteration and English translation, was also published by Professor R. F. Harper, under the title of "The Code of Hammurabi," Chicago, 1904. The most recent translations are by Professor Arthur Ungnad in co-operation with Professor Jos. Kohler, "Hammurapi's Gesetz," Leipz., 1911, and by R. W. Rogers, "Cuneiform Parallels to the Old Testament," New York, 1912, pp. 395-465.

The circumstance, too, that the code of Hammurapi makes scarcely any provision for other forms of medical treatment than surgery may be taken as an indication that at that period medicine in general had not yet developed to the stage in which we find it in the medical texts proper.

Before leaving this subject, it may be interesting to point out as an indication of the beginnings of specialization in surgery that the code distinguishes between the ordinary surgeon and the veterinary, the latter being spoken of as "the cow and sheep healer."[1] On the other hand, in the medical texts, so far as published, surgery is not introduced. It would seem from this that the physician as surgeon was sharply differentiated from the healer of diseases, and perhaps not placed on the same level with the latter. However this may be, the sharp distinction between surgeon and physician reminds us of the custom prevailing in Great Britain and which may, in some of its aspects, be a survival from a very early period.

III.

It will not have escaped your notice that in speaking of the medical texts in Ashurbanapal's library I have already indicated the two avenues of approach leading to medicine—to wit, incantations, accompanied by magic rites on the one hand, and divination practices on the other. A few words must be said about each, in order to clarify the position occupied by medicine in the general scheme of Babylonian-Assyrian civilization. The approach from the side of incantations is, of course, a familiar phenomenon in the development of medicine everywhere. The belief that disease is due to demoniac possession is universal at a certain stage of human culture, but in Babylonia and Assyria this belief is extended to include all the mishaps and accidents of life. It was a convenient theory to shift the blame for anything disagreeable that happened to you from yourself, where it generally belonged, to someone else. The first act of man, according to the Bible, was to indulge in this weakness. The woman in that oldest of garden parties takes the place of the demon, and the woman shifts the blame on to the serpent, who is *really* a demon. So far as disease and physical ills are concerned, the theory was one that would naturally

[1] §§ 224, 225 of the Code stipulate the fee of the veterinary in case of a cure as one-sixth of a shekel, and in case the cow or sheep dies, imposes a fine on the veterinary of one-fourth of the value of the animal.

suggest itself. Even the unsophisticated child of to-day—a specimen that is fast dying out under the strain of the new pedagogy—might be led to the conclusion that a violent cramp in the stomach, or a throbbing of the head, was due to something alive that had found its way inside the body; and strange to say, modern medicine would tend to confirm the childish notion in the case of many diseases, now ascribed to the action of noxious germs which are certainly very much alive. Primitive man, standing under the influence of a widespread belief that everything that manifests power or growth is alive—a theory to which the name Animism has been given—thus becomes the unconscious originator of the modern germ theory, but he personified the

FIG. 1.[1]

Heads of Babylonian and Assyrian Demons. Photographs from objects in the British Museum and reproduced by kind permission of Messrs. Luzac and Co., from R. C. Thompson, "The Devils and Evil Spirits of Babylonia," Lond., 1903, i, Pl. ii.

germs by giving them a human or an animal shape, or a combination of the two (fig. 1). The Babylonians and Assyrians also differentiated their demons, just as we do our germs. There was a special demon, *Ashakku*, for a wasting disease, probably a form of tuberculosis. Another demon, with the appropriate name of *Akhkhazu*, "the Attacker," was the demon

[1] The reproduction of illustrations from texts and objects in the British Museum is by kind permission of the Trustees of the British Museum. Figs. 2 and 3 are from cuts made for the Numismatic and Antiquarian Society of Philadelphia; they are kindly lent by the Society, for which acknowledgment is hereby made.

of liver troubles. *Labartu* was a gynæcological demon, pictured as a horrible monster, with swine sucking at her breasts, who was made responsible for the death of infant children, and of women in child-birth; and so on through a long list. A cure, therefore, involved driving the demon out of the body, either forcing him out or coaxing him out. Incantations as a means of bringing this about are therefore to be viewed as the antitoxins of primitive medicine, acting primarily on the demons, and merely as a resultant incident bringing about the cure of the patient. Even language in ancient days falls under the spell of the animistic theory, for since words have power, they too are alive. The mystic sounds of speech, the sound of thunder, the sound of the wind, the roaring of the sea, the rustling of the leaves—all were imbued with life. I need only remind you of the part played by the "Word" of God in the first chapter of Genesis, and of the doctrine of the Logos, or the "Divine Word," in the Gospel of John, which becomes the basis of Christian theology, to show how even in the advanced forms of thought we are still at the mercy of animistic conceptions; just as we find it difficult, even nowadays, to picture an infinite power without falling back into the language of animism.

Babylonian-Assyrian medicine never cut loose from this close association with incantations. Combined with incantations, moreover, certain ceremonies were enacted, in order to symbolize the manner in which the relief of the patient from the grasp of the demons was to be expected. These rites lead to the actual introduction of medical remedies. By the side of what we may call "direct sympathetic magic," such as the tying of knots in a cord, to symbolize the hoped-for imprisonment of the demon after he had been driven out of the body, or placing a little boat made of some material on the waters, to symbolize the expected departure of the demon, we have in a well-known text[1] a variety of indirect methods, such as the peeling of an onion and

[1] Shurpu Series, Tablets V-VI, 50-143, published by Zimmern, in "Beiträge zur Kenntniss der Babylonischen Religion," Leipz., 1901. Similarly, in another incantation series known as Marklû, published by Tallqvist, "Die Assyrische Beschwörungsserie Maqlû," trees, plants, herbs, and weeds are introduced in connexion with magic rites, such as *ninu* (mint), *khaldappan* (perhaps "oleander"), cassia, *pu*-plant, chicory, grain, herbs like *upuntu*, *mashtakal*, and *sapparu*; *sikhlu* (a weed), *lardu*, *sammu*, *araru*, *nulukhkha*, *kan-kal*, and *an-khul*, tamarisk tree, seeds of the *ushû* tree, cedar, *she-u-ku* wood, as well as oil, fat, honey, flour, stones—e.g., Tablet I, 21-26, and 46; III, 177-179; IV, 38 (images of tamarisk, cedar, and fat; *cf.* II, 113, of "honey"; 147, of sesam-grain; 208, of cedar and tamarisk; 187, of pitch smeared with fat); V, 4, 11-17, 30-37 (a list of eight herbs and plants), 53, 54; VI, 35-38, 61, 62, 76-84, 108, 109; VII, 31 (various oils). All these occur as drugs in the medical texts proper.

throwing one peel after the other into the fire to the accompaniment of formulæ, emphasizing the hope that, as one peel after the other is consumed in the fire, and the onion will never take root or blossom again, so the demon might never reappear. Following the symbolical act with the onion, the text proceeds to the enumeration of other materials, such as dates, palm blossoms, bits of sheep and goats' skins, wool, and certain kinds of seed, which are similarly thrown into the fire to the accompaniment of appropriate formulæ, all expressive of the same hope as in the case of the onion.

Now these objects are not chosen at haphazard; they represent the materials introduced into the medical texts, either directly as healing remedies, such as onions, dates, palm blossoms and seeds, or they occur as accessories in medical treatment, such as bits of skin on which poultices and ointments were spread.[1] Similarly, in ritual texts,[2] detailing the ceremonies to be performed by the exorciser, a large number of actual medical compounds are introduced, consisting of such subtances as milk, butter (or cream), honey, wine, oil, meat, salt, dates, flour, and various trees, plants, herbs and stones, which enter as ingredients in the direct treatment of disease. Obviously, through experience it was found that in certain common diseases such as indigestion, diarrhœa, constipation, colds, headaches and fevers, certain articles of food and certain herbs, plants, seeds and juices, were beneficial. Primitive logic concluded that what was good for man must be bad

[1] In the last tablet of the series, incantation formulæ, grouped around the tamarisk, the mashtakal plant, reeds, &c., are introduced—likewise taken from medical texts.

[2] *See* Zimmern, "Beiträge," &c., p. 98, Nos. 1-20, lines 32-54; No. 26, col. i, ii; Nos. 31-37, Stück I; 41-42, Stück I; 45, 50, 56-58, 66-67. Among the trees, plants, and herbs mentioned, which occur in the medical texts as ingredients of prescriptions, are cypress, cedar, tamarisk, liquorice, *shi-lim*-plant, *sikhlu* (a weed), *tul-lal*-plant, male *nam-tar* root, *kur-kur*, *mashtakal* herb, *khashkur* reed, *shumuttum*-plant; among stones, *shubū*, *shu-shar*, *an-gug-me*, *uknu* (lapis-lazuli), *kur-dib-ba*, *dushū*, &c. Various kinds of grain, corn and wheat and flour, made of these and other substances (see especially Nos. 41, 42, 25-43, *she-gud*, *she-shesh*, *enninu*, *she-gig*, *she-ash-a-an*, *tig-gal*, *tig-tur*, *tig-she-khar-ra*, *ku-a-ter*, &c.), also occur in medical prescriptions. As further evidence of the direct connexion of these ritual texts with medical treatment, and that they constitute the ritual to accompany medicinal treatment of disease, I may point (*a*) to such specific drugs as "Ninib" salve (Zimmern, *ibid.*, No. 26, col. ii, 7, which occurs in medical prescriptions—for example, "Cuneiform Texts from Babylonian Tablets, &c.," xxiii, Pl. 41, 11); (*b*) to the phrase *ba-lu pa-tan* (Zimmern, *ibid.*, No. 19, reverse, line 6), "without food," constantly introduced in medical texts to indicate that the mixture is to be taken fasting; (*c*) to the occurrence of the same technical terms—to wit, rubbing, mixing, wrapping, pouring, washing, spreading, &c., as in medical texts; (*d*) the invocation to the god Ninib and his consort Gula, the patrons of medicine (for example, Zimmern, *ibid.*, Nos. 1-20, 32, 40, and No. 25, 3); (*e*) wine libations (Zimmern, *ibid.*, No. 26, col. iii, 35, to iv, 11), corresponding to the consistent direction in the medical texts to take the prescribed remedies in wine; (*f*) frequent mention of oil, honey, milk, butter, &c.

for the demon, and accordingly the remedies were attached to the incantations as helpful accessories to the powerful formulæ, and symbolically introduced in the ritual accompanying the direct medical treatment of disease.

This aspect of magic rites helps us to understand another phase of Babylonian-Assyrian medicine which will be illustrated by the examples that I shall place before you—namely, that by the side of really helpful remedies we find not infrequently concoctions and mixtures that are primarily nasty and ill-smelling. You are aware that right through the Middle Ages popular medicinal remedies included such materials as the dung and urine of man and animals, as well as all sorts of foul and decaying material—an elaborate *Dreckapotheke*, to use the expressive German term given to these substances by a scholar of the eighteenth century who made a compilation of them.[1] We can gather quite an extensive *Dreckapotheke* from the incantation and ritual texts, as well as from the medical texts proper. It is, I think, a fair conclusion that such remedies were originally applied to the demons in the hope of disgusting them by foul smells, to induce them to fly to surroundings where the air was purer, and the odours less disagreeable. The priests being quick to incorporate in religious practices the popular medical experience of the day thus rendered the bond between incantation rites and medical treatment indissoluble for all times. The independent development of medicine in Babylonia-Assyria was kept in check through the persistency of the alliance with sacred formulæ and with rites based on sympathetic magic.

Only one degree less important than the part played by incantation rites in the Babylonian-Assyrian medicine of all periods is the relationship between medicine and divination practices in the region of the Euphrates and the Tigris, where in the course of many centuries several elaborate systems of divination were produced, all aiming at the interpretation of signs that either involuntarily obtruded themselves or were sought out as a means of determining what the future had in store. Since everything came from the gods, this was equivalent to ascertaining what the gods intended by the sign sent or by the sign artificially obtained. Incantations were resorted to when the evil had come; divination was a means of forestalling the future, at least to the extent of being prepared for the impending blow. Incantations in their relation to medicine correspond to curative measures; divination was

[1] K. F. Paullini, "Heilsame Dreckapotheke," 1714 (reprinted Stuttgart, 1847).

the unconscious forerunner of preventive medicine. To discuss the problem of divination here would take us far afield,[1] and I must content myself with indicating in the briefest possible manner the three chief systems of divination perfected in Babylonia-Assyria, each of which has a bearing on Babylonian-Assyrian medicine.

The first, and probably the oldest, of these methods was the endeavour to divine the future through the inspection of the liver of a sacrificial animal, based on the widespread notion among primitive people that the liver, as the bloody organ *par excellence*—blood being associated with life—was also the seat of the soul. The deity to whom an animal was offered identified himself with the victim. The soul of the god and the soul of the animal, as revealed through the liver, were considered to be in unison, like two watches regulated to keep the same time. You looked at the soul of the animal and thus procured an insight into the mind of the god. Before entering on any project—a military expedition, a journey, a business venture, a building operation, or what not—recourse was had to divination through the liver of a sheep, as the usual animal of a sacrifice. All peculiarities in the gall-bladder, in the lobes, in the various ducts, and in the markings on the liver due to the subsidiary bile-ducts, were noted, and partly on the basis of past experience when certain signs on a liver were followed by some favourable or unfavourable event, partly by an association of ideas with the nature of the signs,[2] conclusions were drawn as to the favourable or unfavourable disposition of the gods at the moment of inspection. Answers were thus secured to any question that might be asked, including inquiries

[1] A summary of the chief divination methods devised by the Babylonians and Assyrians will be found in the author's monograph "Babylonian-Assyrian Birth-Omens and their Cultural Significance" (published as vol. xiv, No. 5, of Wünsch und Deubner's "Religionsgeschichtliche Versuche und Vorarbeiten," and in chap. iii of the author's "Aspects of Belief and Practice in Babylonia and Assyria," New York, 1911). A detailed treatment of Babylonian-Assyrian divination, with copious translations of omen texts of all kinds, was given by the author in his German work on the religion of Babylonia and Assyria ("Religion Babyloniens und Assyriens"), ii, pp. 23-415, liver-divination or hepatoscopy; pp. 415-748, astrology; pp. 749-775, oil and water divination; pp. 775-836, animal omens; pp. 836-946, birth-omens; pp. 946-969, summary of dream-omens and miscellaneous omens.

[2] Thus, if the gall-bladder was large or swollen, it pointed to extension of power; if small or shrunken, to decline and weakness. Similarly with other parts of the liver. A long gall-duct, e.g., was a good sign; a short one an unfavourable sign. A sign on the right side of the liver, or of a part of it, was applied to the king's side; a sign on the left to the enemy's side. If, e.g., the gall-bladder was tightly attached on the right side and loose on the left, it was a favourable sign for the enemy, who would hold the king and his army in a tight grasp; if, on the contrary, the left side was firmly attached, it meant that the enemy would be kept under control, &c., &c., *ad infinitum et nauseam.*

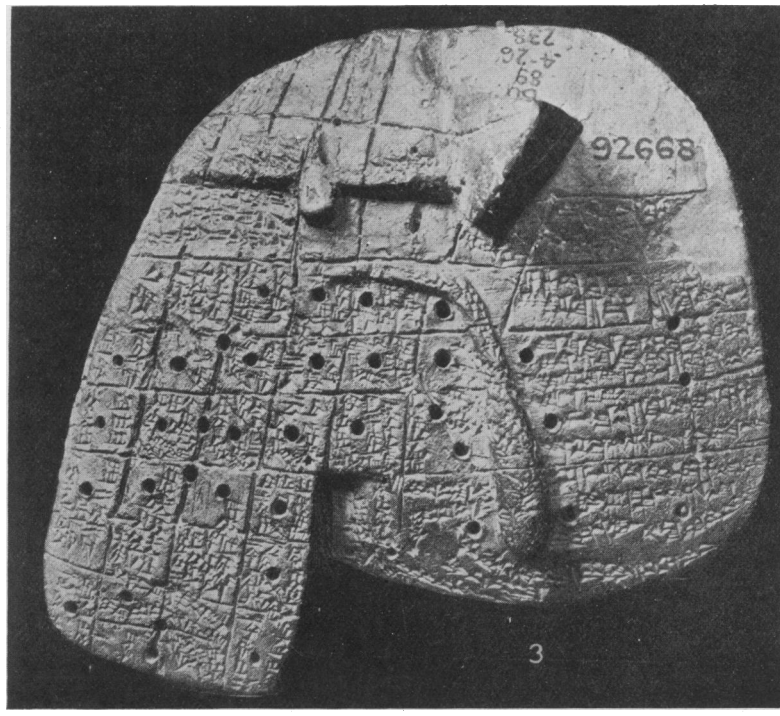


FIG. 2.

Clay model of sheep's liver (now in the British Museum) used as a model in a Babylonian temple school, for instruction in liver-divination. The accompanying inscription which fixes the date of the object at *circa* 2000 B.C. furnishes the prognostications for peculiarities noted at the parts of the liver indicated by the holes. The model is therefore a diagram to explain an omen text in which the peculiarities in question were registered together with the interpretation attached—an illustrative aid to show what portion of the liver was intended in each instance. It will be noted that the lobes of the liver, the *porta hepatis* (or depression separating the upper lobes from the lower ones), the gall-bladder, the gall-duct, the hepatic duct and the two appendices (the *processus pyramidalis* and *processus papillaris*) are distinctly shown, while the lines are intended somewhat conventionally to indicate the markings on the liver—due to the tracings on the surface of the liver of the subsidiary ducts that collect the bile from the liver into the main ducts. Technical names for all these and other parts and subdivisions of the liver were introduced by the Babylonian diviners, as well as rather fanciful designations for the markings on the liver, which were compared to weapons, to parts of the human body and so forth—thus extending the scope of hepatoscopy that finally led to an elaborate semi-mystical symbolism. The photograph and text are published in "Cuneiform Texts from Babylonian Tablets, &c., in the British Museum," part vi, Pl. 1-3.

as to the outcome of a disease with which someone was afflicted. Besides this direct bearing of hepatoscopy on one aspect of medicine, the practice of liver-divination led to the study of the liver, and it comes somewhat in the nature of a surprise to us to encounter in the extensive collections of liver omens, compiled by Babylonian-Assyrian priests, a detailed knowledge of the parts of the liver as well as an extensive anatomical terminology and a careful entry of all manner of pathological signs which, since liver diseases are common in tropical and sub-tropical regions, were frequently encountered in the organs of the sacrificial animals (*see* figs. 2, 3, 4, 5, 6). The study of animal anatomy and animal pathology thus received a direct stimulus from a practice that eventually degenerated into superstition—that is, a rite based on beliefs that had been outgrown.

Another system of divination that had an even more direct bearing on the study of the human frame in health and disease was the observation of signs noted in the case of infants and animals at the time of birth. The diviner—the native name for whom, *bârû*, defines him as an "inspector"—observed any striking traits in the case of the new life, any mark that would seem to be unusual or abnormal. The range of observation extends from large or small ears, eyes, head, mouth, nose, to real deformities and monstrous anomalies, such as children or animals with two or more heads, with an excess number of limbs, and the whole province of congenital defects and pathological malformations. The greater the abnormality the more significant the sign.[1] In the interpretation the same two principles that hold good for liver divination were followed—past experience and association of ideas. Thus an abnormally large organ of the body pointed to extension, to power, to success; an abnormally small one to weakness, disease and failure. By a further distinction, according as the sign appeared on the right side or the left, the possibility was afforded of specifying in whose favour the favourable sign pointed, or against whom the unfavourable sign was directed. The right was as usual your side, the left the other fellow's, which generally meant the enemy's side. What was favourable to you was unfavourable to your enemy, and vice versa.

Birth-omens also have their underlying principle. The observation of signs at the time of birth rests on the mysterious phenomenon of

[1] *See* extract from the omen texts in the author's monograph "Babylonian-Assyrian Birth-Omens," &c., above (p. 118, note 1) referred to. Fig. 7 is a specimen of a birth-omen text.

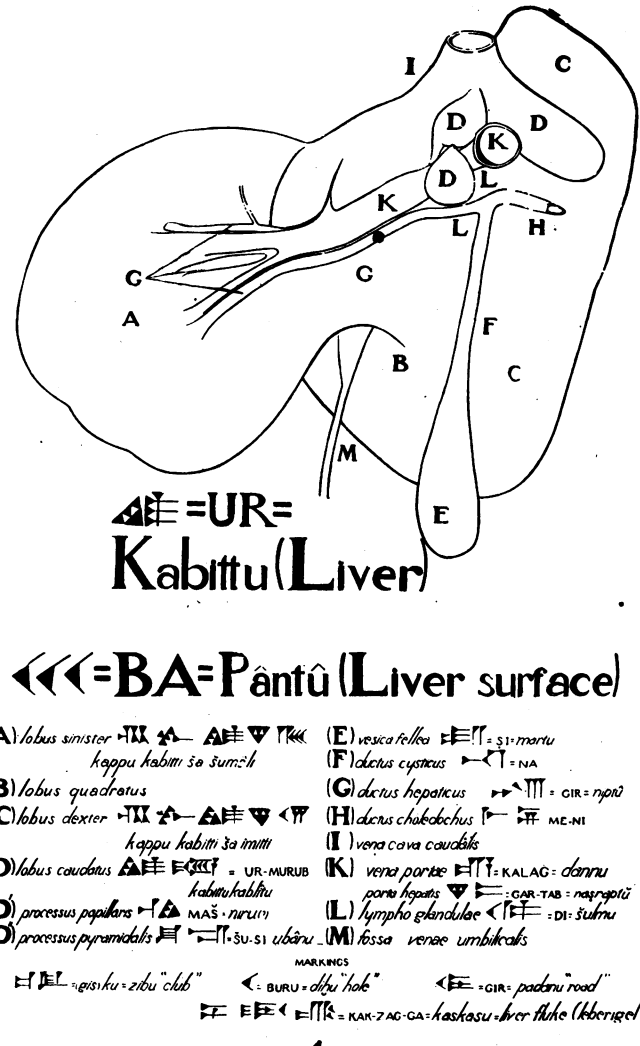


FIG. 3.

Drawing of a sheep's liver, with the Latin and Babylonian-Assyrian designations, in illustration of the anatomical nomenclature developed through hepatoscopy.

a new life issuing from another, and which made so profound an impression on primitive man. The time of birth, moreover, was a moment of transition, and as such was fraught with significance. The transition *motif* runs like a melody with many variations through the religious practices and popular customs of peoples everywhere. The chief popular rites—birth customs, puberty rites, marriage ceremonies and funeral rites—correspond to the four transition periods in the life of the individual.[1] Similarly, the chief festivals in every religion take place at transition periods—at the spring and autumn equinoxes, at the summer and winter solstices. The mystery of birth, marking the transition of the new life from its hiding-place, thus leads to the wide range of birth-omens illustrated by hundreds of texts in Ashurbanapal's library. A direct result of this system was to afford a stimulus to the study of anatomy and physiology, normal and abnormal; and this time not confined to animals. The birth-omen texts reveal an amazingly extensive anatomical and physiological nomenclature, covering every portion of the body and extending to minute differentiations.[2] Another by-product of birth-omens was the study of human physiognomy as a means of reading man's character and fate, and which, as I have endeavoured to show in a special monograph on birth-omens,[3] is to be traced back to Babylonian-Assyrian birth-omens, spreading to Greece and Rome and then to Central Europe, and maintaining its hold as a pseudo-science to the threshold of modern science.

Through liver divination, and more particularly through birth-omens, attention was thus directed to all kinds of peculiarities appearing in any part of the body and at any time, on the general principle that the unusual and the abnormal, while having special force at a period of transition, were always fraught with some significance; they pointed unmistakably to some unusual happening.

[1] *See* the interesting study of such rites by Arnold van Gennep, who appropriately calls his work "Rites de Passage," Par., 1909.

[2] An admirable study of the Babylonian-Assyrian names of the parts of the body by Harri Holma, "Die Namen der Körperteile im Assyrisch-Babylonischen," Helsinki, 1911, *Annales Acad. Scient. Fennicæ*, Ser. B, vii, 1, shows how extensive the anatomical nomenclature grew to be in the course of time.

[3] "Babylonian-Assyrian Birth-Omens and their Cultural Significance," Giessen, 1913 (*see* above, p. 118, note 1). In this monograph I also endeavour to furnish the proof for the thesis that the ancient conception of monstrosities as "signs" (*monstra*) sent by the gods, foreshadowing coming disaster, rests on the significance attached to birth-omens, and that the fabulous hybrid creatures and monsters of mythology (fawns, satyrs, tritons, mermaids, cyclops, Cerberus, Pegasus, sphinxes, &c.) revert to the same source and represent the fanciful elaboration of anomalies observed in infants and in the young of animals.

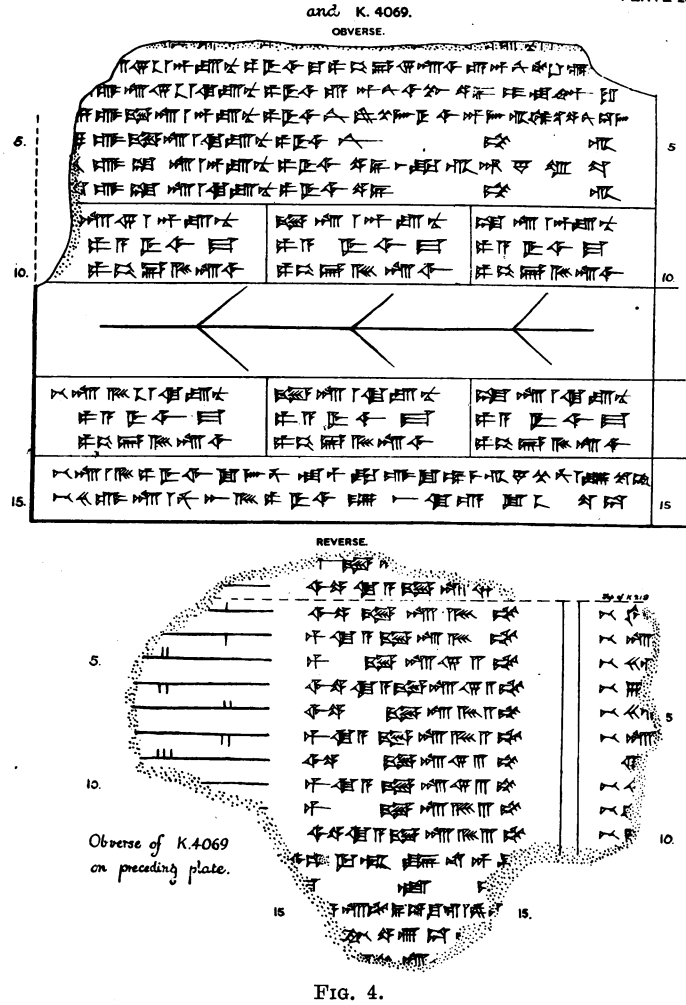


FIG. 4.

Diagrams to illustrate the signs on the liver referred to in the accompanying texts, which are to be regarded as handbooks of instruction and in the temple schools. In the upper portion, the long line appears to be intended for the hepatic duct and the branches to either side for the subsidiary ducts flowing into the hepatic duct. Above and below the diagram, explanations are added in the three sections separated from one another by dividing lines. The hepatic duct (as were other parts of the liver) was divided into three parts, known as the head, middle and base. The explanations above the diagram refer to the branch, i.e., to the subsidiary duct found at the head, at the middle, and at the base respectively; the three sections below the diagram refer similarly to the subsidiary ducts at the three divisions but lying on the other side of the hepatic duct, which is designated as the left side in contradistinction to the right side. The diviner holds the liver in his right hand with the part of the large finger-shaped appendix *(processus pyramidalis)* nearest to him. Above and below the three sections are a series of omens in which the interpretations for the appearance of branches or subsidiary ducts at the various intersections are added to the description of the signs.

The lower portion of the plate, showing the reverse of the tablet, is another diagram to illustrate divisions or notches on the hepatic duct, the accompanying explanation specifying a notch to the right above or below the duct, two notches to the left above and below, two notches to the right above and below, three notches to the left, above and below, &c. At the top of the reverse we may restore two lines, one showing a notch above the line at the left end, the other a notch below at the left. Similarly, at the bottom we may restore a line with three notches below the line, at the left end, another line with three notches above at the right end, a third with three notches below at the right end. The illustration is taken from "Cuneiform Texts from Babylonian Tablets, &c., in the British Museum," part xx, Pl. 28. The tablet belongs to the Kouyunjik collection—which is the designation of the texts forming part of Ashurbanapal's library. The text is probably a copy of a much older Babylonian original.

Included in the omen literature of Ashurbanapal's library are several elaborate series, all dealing with parts of the human body, grouped in a more or less systematic sequence, and concerned with the interpretation of peculiarities of diseases, or symptoms of diseases, connected with the head, the eyes, the neck, the spine, the limbs, and so on, through the entire human frame.[1] This subdivision of omen texts thus forms a supplement to the medical texts proper, though of importance chiefly because of the illustration that it affords of the association that continued in force between medicine and divination practices down to the latest periods.

The third system of divination was astrology, based on the principle that the movements in the heavens—the sun, moon, planets, and stars being identified with gods—represented the activity of divine beings preparing the events to take place on earth. Heaven and earth were the two scales of a perfectly adjusted balance. While the phenomena in the heavens were observed primarily with a view of determining what the gods proposed in connexion with the larger affairs of the country—the outlook for the crops, the outcome of a military expedition, and the general welfare of the country—astrology also was resorted to for the purpose of determining the course and outcome of a disease, according to the day of the month on which it began,[2] or according to phenomena observed in the moon or the planets at the time that the disease was raging.

While having less of a bearing on Babylonian-Assyrian medicine than the other two systems, astrology nevertheless enters as a factor which we encounter again in a much more extensive form in the case of the very late medicine of Syria.

The net result of the bearings of divination on medicine may be summed up in the statement that as a consequence of the persistent hold maintained by the belief in signs of all kinds, disease became

[1] *See* Jastrow, "Religion Babyloniens und Assyriens," ii, p. 212, note 3, and p. 950 *et seq.*, for specimens of such texts in Boissier's "Documents Assyriens relatifs aux Présages," Par., 1894, pp. 20-26, 42, 97-99, 213-216, 244-247, 251-261; also "Cuneiform Texts," xxviii, Pl. 16 (K 9614), 18 (K 13959), 24 (82-3-23, 38), 25-29, 37 (79, 7-8, 89). *Cf.* Boissier's article on "Iatromantique, Physiognomonie et Palmomantique Babyloniennes," in the *Rev. d'Assyriologie*, viii, pp. 33-39. These specimens are from three elaborate series dealing with sickness omens.

[2] E.g., in the text, K 3962 (Boissier, "Documents Assyriens relatifs aux Présages," pp. 20-26). The series beginning "On the first day that he is taken sick" appears to have dealt in detail with this combination of medical omens and astrology. The frequent references in astrological texts to sickness and death in connexion with phenomena in the heavens on certain days further illustrate this association between medicine and astrology, which is maintained through the Middle Ages.

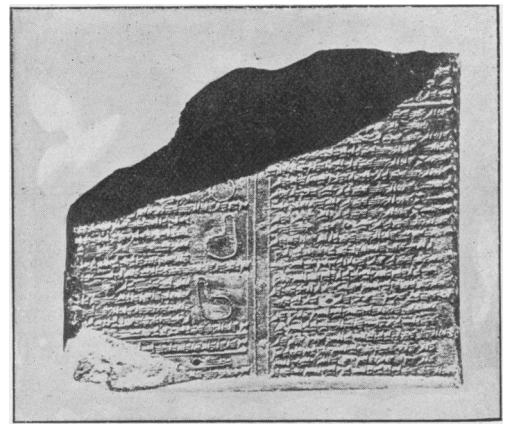
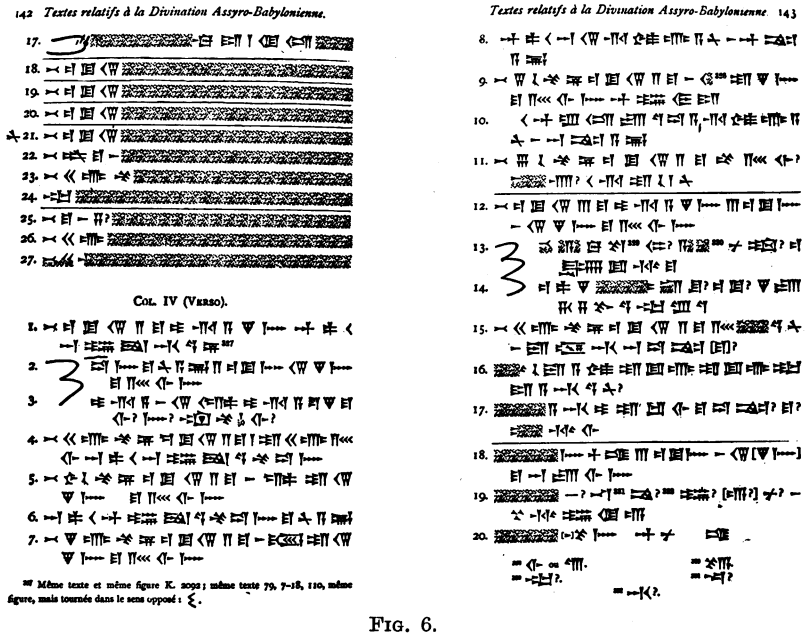


FIG. 5.

Photograph of the reverse of an omen tablet of Ashurbanapal's Library (K 1999), showing an illustration of the *processus pyramidalis* on a sheep's liver in different directions. The interpretations vary according to the shape and position of this part of the liver. This appendix, from its resemblance to a finger, was called the "finger" of the liver, while the Romans, who obtained their liver-divination from the Etruscans, called it the "head" of the liver (caput jecoris or jocinoris). Reproduced after Boissier, "Documents Assyriens relatifs aux Présages," Par., 1894.



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Textes relatifs à la Divination Assyro-Babylonienne 143

FIG. 6.

Photograph of the obverse of an omen tablet of Ashurbanapal's Library (K 2086 + 82, 3-23, 26 + 83, 1-18, 421), with diagrams illustrating the various forms of markings on the liver, spoken of as "weapons." According to the form of these "weapons" (two loops, three loops, "shaped like a head," &c.), the interpretation varied. Reproduced after Boissier's "Choix de Textes relatifs à la Divination Assyro-Babylonienne" (Geneva, 1905), pp. 142-143.

primarily an omen, the interpretation of which on the part of the priest as diviner supplemented the efforts of the priest as exorciser; while the priest as healer availed himself of both these aids to supplement his efforts in the direct treatment of the disease. These three aspects of Babylonian-Assyrian medicine — exorcism, divination, and medical treatment—blend together to form a composite picture in which it is not always possible to distinguish the different strains.

Before leaving this subject, let me call your attention to the wide spread of these systems of Babylon-Assyrian divination throughout the ancient world, primarily among the Greeks and Romans, but including also Egypt on the one hand and extending, as seems quite definite from certain indications, even to India and distant China on the other. The Greek and Roman inspection of the entrails involved primarily the observation of the liver, and at one time was exclusively confined to this organ. We have the direct proof for this in a remarkable bronze model of a liver found near Piacenza, containing an inscription in Etruscan characters (fig. 8). This bronze model forms a perfect parallel to the clay model of a liver found in Babylonia (fig. 2), and to a number of similar models unearthed a few years ago at Boghaz-Keui—an ancient Hittite centre in North-western Asia-Minor.[1] Connecting links, showing the spread of Babylonian-Assyrian liver divination across Asia Minor to Greece and Rome, have now been established beyond any reasonable doubt.[2] Similarly, with the interchange of ideas between Greece and the Orient following upon the conquests of Alexander, the system of Babylonian astrology was superimposed on Greek astronomy, which had hitherto been cultivated by the Greeks without any connexion with divination[3]; while, in return, the astronomical science of

[1] These models, of which there are a number in the Berlin Museum, are precisely of the same character as the one found in Babylonia, and are likewise covered with cuneiform inscriptions. The evidence is thus complete for the spread of Babylonian hepatoscopy at a period as early at least as 1500 B.C. across Asia Minor—the probable home of the Etruscans, who carried the method to Italy, while Greece may have received it directly through the migratory movements from Asia Minor across the Ægean Sea. Halliday, in his recent work on "Greek Divination," Lond., 1913, pp. 187-197, underestimates the bearings of the ascertained facts.

[2] *See* the author's paper "The Liver as the Seat of the Soul" in "Studies in the History of Religions presented to C. H. Toy," New York, 1912, pp. 143-168.

[3] *See*, for details, Jastrow, "Religion Babyloniens und Assyriens," ii, pp. 741-749, and chap. iv of the author's "Aspects of Belief and Practice in Babylonia and Assyria." Messrs. Boll and Bezold have recently furnished the evidence in a joint paper on "Reflexe astrologischer Keilinschriften bei griechischen Schriftstellern" (Heidelberg Akad. d. Wiss. Philos., histor. Klasse, 1911, No. 7) of the dependence of the astrological compilations of the Greeks upon the astrological omen texts of the Babylonians and Assyrians—extending at times to direct translation into Greek of data found in the cuneiform texts.

the Greeks made its way to Babylonia, and eventually brought about the decay of astrology in the country in which it had developed its greatest strength. The observation of birth-omens, similarly, passed through Asia Minor across to the West, and we find traces of this form

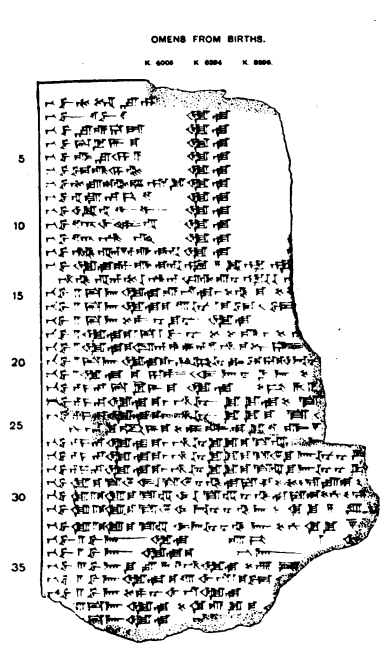

FIG. 7.

A birth-omen text from Ashurbanapal's History (K 4005, &c.), specifying the interpretations for the case that a woman gives birth to an unshaped fœtus, to misshapen beings of various forms, &c. Other portions of the series to which this fragment belongs specify such cases as when a woman gives birth to a deaf-mute, to an idiot, to a child born with teeth, to a bearded child, to two fully formed boys, to a boy and a girl, to two girls, to a serpent—i.e., a child that suggests by its tiny head and body a serpent (Pliny, "Hist. Nat.," vii, sect. 3, and Julius Obsequens, "De Prodigiis," sect. 57, record the same "monstrous" birth of a serpent)—to a child with a lion's face—i.e., a large face and head suggesting a lion—with six fingers on the right or left hand, or six toes on the right or left foot, or six fingers (or toes) on both hands (or feet), &c. There are hundreds of such texts in the Kouyunjik collection, detailing all kinds of abnormalities and monstrosities, possible and impossible, with interpretations attached. The plate is reproduced from "Cuneiform Texts from Babylonian Tablets, &c., in the British Museum," part xxvii, Pl. 4.

of divination in the widespread belief in monsters, which, as the name clearly indicates, were originally regarded as signs (*monstra*) at the time of the birth of an infant or an animal.[1]

[1] *See* the author's monograph on "Babylonian-Assyrian Birth-Omens," &c., above referred to, and a paper on "Babylonian, Etruscan, and Chinese Divination," published in abstract in the "Actes du IVe Congrès International d'Histoire des Religions," pp. 106-111.

We need not be surprised to find that Babylonian-Assyrian civilization should have left its traces so prominently in the spread of divination practices. It frequently happens that the by-products of a civilization (like the "evil that men do [which] lives after them") proves more attractive, and exerts a more potent influence than the better achievements which, as the expression of a people's peculiar genius, are not so readily transferred from one ethnic group to the

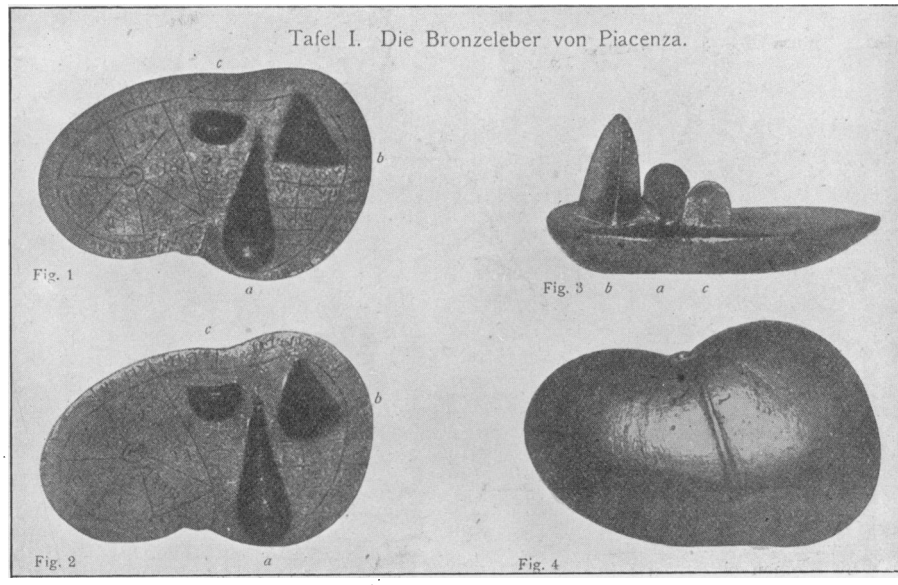

FIG. 8.

Bronze model of a sheep's liver found in 1877 near Piacenza and now in the Museo Civico of Piacenza. The model forming a parallel to the clay model from Babylonia (fig. 2) shows the same parts of the liver clearly marked, though somewhat more conventionally executed. It dates from about the third century B.C. and was used in the Etruscan schools of augury as an object-lesson for instruction in hepatoscopy, precisely as was the Babylonian counterpart. Like the latter, it is covered with inscriptions to elucidate the significance attached to signs noted in the various subdivisions of the liver. The lines diverging from the small circle on the left lobe of the liver correspond to the intersecting lines drawn on the Babylonian model—intended perhaps to indicate conventionally the traces of the subsidiary ducts or the markings on the liver. An entirely satisfactory interpretation of the Etruscan inscription which contains the names of deities must be postponed till scholars shall have found a definite key to Etruscan, but it would appear that the Etruscans went beyond the Babylonians in attaching to liver-divination an elaborate symbolism, which rested on a supposed correspondence between the parts of the liver and the heavenly bodies—the liver as a microcosm reflecting the macrocosm. For further details see the author's work "Aspects of Belief and Practice in Babylonia and Assyria," New York, 1911, chap. iii, and the author's "Bildermappe zur Religion Babyloniens und Assyriens," Giessen, 1912, No. 104, and the literature there referred to.

other. The example of Greek art did not produce an artistic movement of equal significance in Rome, despite all that Rome took over from the Greeks. The philosophical systems of India, profound and impressive, were not adapted to the Western mind, and therefore did not pass beyond the bounds in which these systems arose. The teachings of the Hebrew prophets lay neglected for centuries, and the attitude towards life among the Western nations had to undergo a complete transformation before, under the sway of Christianity, they became the basis of modern civilization. So it happened that the more obvious legacies of the Babylonian civilization were a superstition—hepatoscopy—and two pseudo-sciences—astrology, and the determination of the fate of individuals through the study of their facial features.

IV.

The medical texts in Ashurbanapal's library, to which we are now prepared to turn,[1] reveal in their phraseology the attachment to the

[1] Up to the present time we have had two publications of medical texts from the Kouyunjik collection: (1) Küchler's "Beiträge zur Kenntniss der Assyrisch-Babylonischen Medizin," Leipz., 1904, and (2) "Cuneiform Tablets from Babylonian Tablets, &c., in the British Museum," part xxiii (London, 1906), containing Pl. 23-50, medical remedies accompanied by incantations and magic rites, and Pl. 1-22, incantations and magic rites for exorcising the demons of disease with medicinal mixtures introduced as accessories. On these two classes of medical texts see further below. In the *Zeits. f. Assyriologie*, xix, pp. 175-181, C. Fossey has also published an interesting medical text from Ashurbanapal's library, containing remedies against poisonous bites. The credit of having been the first to call attention to the medical texts in Ashurbanapal's library belongs to Professor Sayce, who published portions of several texts in the *Zeits. f. Keilschriftforschung*, i, pp. 1-14 and 205-216, under the title of "An Ancient Babylonian Work on Medicine." Naturally Sayce's first attempts at translating these texts have now been superseded. A survey of the literature on Babylonian-Assyrian medicine, arranged chronologically and brought down to 1902, will be found in von Oefele's monograph "Keilschriftmedizin, Einleitendes zur Medizin der Kouyunjik-Collection" (Abhandlungen zur Geschichte der Medizin ed. Magnus, Neuburger and Sudhoff, Heft iii), Breslau, 1902. Freiherr von Oefele has published a large number of papers on special points on Babylonian-Assyrian medicine, scattered throughout medical journals (*see* the list in his monograph, pp. 8-15, supplemented by Budge, "The Syriac Book of Medicines," i, p. cl, note 1), but while the papers contain many interesting suggestions, and von Oefele's researches, extending over many years, have contributed to our knowledge of Babylonian-Assyrian medicine, many of his deductions are based on insufficient proofs, and he is too strongly inclined to speculations which are not justified by the texts themselves. This applies particularly to his monograph on "Keilschriftmedizin in Parallelen" ("Der Alte Orient," iv, 2), which gives a distorted view of Babylonian-Assyrian medicine and indulges in phantastic theorizing, which is unfortunately introduced also in von Oefele's sections on the subject in Neuburger and Pagel's "Handbuch der Geschichte der Medizin," i, pp. 19-74 and 94-101 (English translation with an introduction by Sir Wm. Osler in course of publication). The entire chapter is sadly in need of a thorough revision in order to bring it up to the standard of our present *real* knowledge of the subject, based on a detailed study of the texts at first hand.

two sources whence they are derived—incantations and divination practices. Each section begins precisely in the style of the omen texts with a sign to be read *enuma*, signifying "When." The formula reads: "When a man has this or that symptom," or "when he has this or that disease," just as the omen texts of all classes begin with, "When so-and-so is the case," "When the liver shows such and such signs," "When the moon or sun or a planet presents such and such phenomena," "When a child, or a sheep or some other animal, is born with such and such marks," "When the head, neck, arms, and so forth of a human being present such and such peculiarities," and so forth. Corresponding to the interpretation of the omen, we have in the medical texts the directions as to what is to be done. "*Ana balaṭishu*," "for the man's life." The terms used to indicate that someone is troubled with a disease are similarly derived from the incantation *motif*—namely, "eating" and "seizing." Pain is when a man's head, stomach, bowels, liver, or any other portion is being eaten, or, more precisely, that someone is "eating" a part of the body. The expression finds its natural explanation as a transfer to medical diagnosis of the belief that a demon is gnawing at some part of a man's body. The other term "seizing," as, e.g., that a man is "seized" with a fever, a headache, or the like, as we also say, is similarly derived from the theory that a demon has taken hold of a man's head, stomach, breast, and so forth.

Interspersed with the remedies are incantations and magic rites, and we are constantly surprised at finding in connexion with prescriptions of medicinal potions, or mixtures, such directions as that the patient should put a hair taken from an old woman's pudenda into his mouth; or that he should take hairs from the tail or other parts of the body of a male or of an unmounted female kid with certain medicinal plants, or that he should swallow the mixture while holding it in his left hand, and drink it to the accompaniment of an incantation. Lastly, the texts themselves are compilations from various sources, such as are the collections of omens. In both instances the aim of the compilers is to gather the experience of the past. Corresponding to the various interpretations registered for the same omen, we have in the medical texts the description of the physical ailment, followed by a larger or smaller series of variant remedies. It was the business of the physician to select in each case one which, in his judgment, would be the most likely to bring about results; or he would try them all in some order of succession in the hope of finding one to fit the case.

Now, while there are many hundreds of medical texts that still lie unpublished in the British Museum, though there is now a prospect of more being placed at the disposal of scholars,[1] it is, I think, perfectly safe to say that the general principles of medical treatment and the general character of the remedies applied as resulting from the material already at our disposal will not be essentially affected. Progress will be rather in the direction of identifying the substances used as drugs. This problem constitutes at present the most formidable obstacle to a complete understanding of the medical texts. We may distinguish two classes of these medical texts—those in which incantations play a secondary part, regarded together with magic rites as accessories to the treatment, and those in which incantations and magic rites are quite as prominent as, and indeed overshadow, the treatment.[2] I am inclined to regard the latter as considerably older than the former, and it will, I think, be regarded as natural to find in later texts the medical aspects more largely emphasized, and the incantation element reduced in proportion.

We have not as yet discovered in the medical literature of Babylonia-Assyria any compilation corresponding to such extensive and systematic hand-books like the Papyrus Ebers, or the Berlin or Hearst papyri in Egyptian medical literature, though it is quite likely that such complete compilations existed. We have, however, portions of a number of series, each one of which covered several tablets and that dealt with a variety of diseases.

One of these series,[3] known from the opening words as "When a man has a cold," &c., deals, so far as we can see from the portions published, with a variety of troubles having their seat in the stomach, in the intestines, and in the liver. The tablet begins with the diagnosis of a cold which has settled in the stomach: "If a man is sick of a

[1] Mr. R. C. Thompson, who copied the texts in "Cuneiform Texts," part xxiii, and who has published studies on them in the *Proceedings of the Society of Biblical Archæology*, 1908, xxx, pp. 63-69 and 245-251, and in the *American Journal of Semitic Languages and Literature*, xxiv, pp. 1-6 and 323-353, has in preparation the publication of over 500 additional medical tablets or fragments from the great collection in the British Museum.

[2] *See* above, p. 111, note 1.

[3] Tablets I-III of the series, so far as preserved, have been published by Küchler in the work above (p. 129, note 1) referred to. Other portions of the series are represented by KK, 2433, 2440, and 3516, according to indications in Bezold's "Catalogue of the Cuneiform Tablets in the Kouyunjik Collection." The titles of what would correspond to modern books are in Babylonian-Assyrian literature chosen from the opening words of the first tablet of the series. An interesting survival of this custom is the designation of Papal Bulls from the opening words.

cold,[1] which has turned into stomach pains, let him compound "pestilence" root, liquorice root,[2] Tar-mush[3] plant" (perhaps the bean) "Shi-lim (darnel)"[4] Shi-man, Tu-me and "tongue" plants — these seven drugs placed in wine let him drink, as the star rises[5] (i.e., at night) and in the morning without food and he will recover."

Passing by the identification of the enumerated plants for the present, it will be seen that we have here a simple prescription directing the physician to prepare a mixture of drugs made from roots and plants to be taken as a potion in the morning and evening without food, or, as we would say, "fasting," or before his meals. There is nothing to suggest any connexion with the magic ritual. In the next paragraph, however, directions for a magic rite accompanied by an incantation are set forth. The one who has stomach pains is to be taken during his illness on a boat, and a series of incantations, technically known as "house of light," are to be pronounced over him, and, it is added—precisely as in the case of the potion—"he will recover." There follow a series of variant directions for the same troubles, which will illustrate one of the leading principles of these tests—namely, to put together on the basis of past experience as many remedies as possible. No differentiation appears to be made as to the stage of the disease at which the one or the other remedy is to be administered. On the other hand, the enumeration reveals some interesting methods of procedure.

> "If the same is the case" (indicated by the repetition sign) "he should suck the white meat of a swine without food and he will recover.
>
> "If *ditto*, let him take liquorice root in water without food and he will recover.

[1] *Su'alu*, which Küchler (p. 65), though hesitatingly, compares with the Arabic *su'al*, "cough," but which I think is used in a larger sense, like the current use of our "cold." The word is of frequent occurrence in both medical and incantation texts—e.g., Shurpu series, Tablet VII, 21-26, in a group with other diseases; also "Cuneiform Texts," xiv, Pl. 31 (D.T. 136), 7-13, in a fragment of a three-column list of drugs with the diseases for which they are to be used, and indications of how they are to be taken.

[2] *Shushi*, identified by Küchler (p. 66) with Aramaic *shûshâ*, glycyrrhiza (Löw, "Aramäische Pflanzennamen," p. 378), largely found in Babylonia.

[3] I venture to compare this with Talmudic, Arabic, and Syriac *turmûsa* or *tirmis*, "lupinus" (Löw, *ibid.*, p. 394).

[4] *Shi-lim* (a better reading than shi-shi) suggests a comparison with the Arabic *shilâm*, "Lolium," either a weed growing among wheat or a degenerate wheat (*see* Löw, *ibid.*, p. 133).

[5] Lit., "before the approach of a star," used constantly in the medical texts as a standing phrase to indicate the approach of night. Not infrequently the phrase appears in fuller form, "before the approach of the goat-fish constellation," which, perhaps because this constellation or some of its stars were visible for the greater part of the year, became a generic term for the approach of night. A variant phrase is "before the approach of Gula," see below, p. 152.

"If *ditto*, let him compound salt with water and drink it without food and he will recover.

"If *ditto*, let him mix *Amanu*[1] salt without food and he will recover. If a man has stomach pain let that man sit on his feet and have boiling juice of sikruti cassia[2] poured over him and he will recover.

"If *ditto*, let him kneel on his feet and let cold water flow over his head and he will recover.

"If *ditto*, place his head downwards and his feet up, strike his cheek forcibly, rub him violently, say to his stomach 'Be good'; with the left thumb manipulate his buttocks fourteen times, manipulate his head fourteen times, and roll him on the ground.

"If *ditto*, mix *male* pestilence root,[3] liquorice root, darnel (?), *Shi-man* plant, bean (?), *Mashtakal*-plant and *Cynoglosson*[4] and either in water [or wine] let him drink it."

These eight remedies furnish a good bird's-eye view of the scope of Babylonian-Assyrian medicine. The use of liquorice root and of salts in stomach disorders will be admitted to be rational. Swine's flesh plays a prominent part in magic rites, and therefore raises a suspicion that this remedy is symbolical rather than therapeutic, to coax the demon out rather than to help the patient. The reference to the kneeling position in order to relieve the tension of the muscles of the abdomen is exceedingly interesting, and so is the endeavour to stimulate

[1] "Salt of Amanu," occurring frequently in medical texts, and mentioned also in a list of salts ("Cuneiform Texts," xiv, Pl. 31, K 14053, line 11, perhaps also 1, 2). This is evidently identical with our sal ammoniac, which is commonly supposed to be of Egyptian origin—obtained from a temple of the god Ammon. Amanu is the name given in cuneiform literature to the anti-Lebanon range, and it is therefore much more plausible to assume that the salt was obtained from that district. It may have been imported into Egypt and the term there confused by popular etymology with Ammon.

[2] *Kasû*, designated as a "green" plant or herb, is one of the most common substances named in medical texts and in lists of drugs. The juice is in almost all cases specified to be mixed with other drugs or to be boiled in water or wine. In "Cuneiform Texts," xiv, Pl. 22, col. viii, 51, *kasû* is enumerated among "sappy" herbs. The identification with cassia (cinnamomum zeylanicum), which was first suggested by Talqvist, is no doubt correct. (*See* Löw, "Aramäische Pflanzennamen," p. 348 *et seq.*) Several varieties were known, and one of these, designated as *sikruti*, is specified in our passage. The foreign origin of the Greek term "kassia," has always been recognized, and it is a great gain to be now able to trace it to its source. *See* also Holma, "Beiträge zum assyrischen Lexikon," p. 82 *et seq.*

[3] The "male" and "female" of substances are often specified in the medical texts as also in lists of plants. According to "Cuneiform Texts," xiv, Pl. 23 (K 259), line 1, male "pestilence" root is to be used also as a salve for a sore mouth. It is evidently some pungent weed capable of drawing out inflammation.

[4] Another substance that can now be definitely traced back to Babylonian medicine where it is known as *lishan kalbi*, "dog's tongue," of which Cynoglosson (*Plantago major*) is the literal translation. The term has also passed into Syriac and Arabic. (*See* Löw, *ibid.*, p. 243.) Several varieties of Cynoglosson were distinguished by the Babylonians, as is shown by such lists as "Cuneiform Texts," xiv, Pl. 20, 13-19.

the blood circulation by pouring hot or cold water over the patient, though the procedure seems somewhat violent. Still more drastic, and yet having a rational basis, is the effort to produce an equable circulation of the blood by placing the head of the patient low and the feet high, and by administering what was evidently a form of massage manipulation. Will it be regarded as too fanciful if I suggest that the direction to encourage the stomach to accept the violent treatment by telling it "to be good" is to be explained as psychical—the natural impulse to accompany the physical exertion on the part of the physician by emitting some sounds?

Lastly, let me call your attention to the alternative to take the medicine in water or in wine. In most cases light wine, rather than water, is prescribed, evidently for the purpose of making the potion more palatable, precisely as physicians nowadays add some substance agreeable to the taste.

By way of contrast let me now take up a short specimen from the second class of medical texts, in which magic rites and incantation formulæ predominate. It is only proper to add that the translation of these texts offers considerable difficulties, because they are written so largely in ideographic form where the signs stand for entire words, and one is often in doubt as to the precise meaning of the word intended. A tablet belonging to a series for the cure of pain in the muscles or the joints[1] begins with a case of rheumatism settling in the lower extremities. The following directions are prescribed[2]:—

> "Encircle water, taken from the Euphrates[3] with flour of rotten grain,[4] place [within] the circle a *Sha-Shur* reed. Take a measure[5] of grain, place it on the Sha-Shur reed and let the sick man sit [on it]. Fill a Ka measure with rotten grain and put it on the Sha-Shur reed and place the foot of the sick man on it, and cover the foot with a putrid dough[6] made of the rotten grain."

[1] Portions of three tablets of the series are published in "Cuneiform Texts from Babylonian Tablets, &c., in the British Museum," part xxiii, Pl. 1-14.

[2] Pl. 1, lines 2-4.

[3] Reed *sa-kha-an*, like "Cuneiform Texts," xxiv, Pl. 8, 11, and Rawlinson, ii, Pl. 35, 6c, which there appears as a designation of the Euphrates.

[4] Ku, the general designation for "flour" made of any substance, followed by the sign *she* = grain, and *shesh* = *marru*, "bitter," (Brünnow, "Classified List," No. 6442; Meissner, "Seltene Assyrische Ideogramme," Nos. 4582-83), or *limnu*, "bad" (Meissner, *ibid.*, No. 4581). Evidently spoiled grain is intended.

[5] On Gish-Bar as a measure, *see* Hazuka, "Beiträge zu den Altbabylonischen Rechtsurkunden," p. 11.

[6] Gar-Lag-Mal, to be read *lû* (Meissner, *ibid.*, No. 9309), is food that causes discomfort or oppression (cf. Muss-Arnolt, "Assyrian Dictionary," p. 464b), and is so described in incantation texts.

There is apparently described here a poultice of water and grain, on which the patient is to sit and which is also to be placed on his foot. This might, to be sure, be regarded as a primitive method of easing the pain, but the manner in which the directions are given reveal the magic character of the rite and are precisely of the same order that we encounter in pure incantation texts, where great stress is laid on obtaining water from a sacred stream (such as the Euphrates was) and on using ill-smelling foods. The method of surrounding the water with an embankment of grain is likewise indicative of a symbolical rite. The emphasis placed upon the quality of the corn as bad or rotten, and that the poultice is designated as putrid food, leave no doubt that the purpose of the mixture is to disgust the demon. In keeping with this interpretation of the ceremony there immediately follows an incantation to be recited, containing the usual gibberish and ending with the hope, "May so and so, the son of so and so live—recite the incantation." As a third feature, an exorcising ceremony is prescribed in connexion with the preparations and incantation rite.[1]

> "Recite this incantation while covering the thigh. Place the putrid food in a room facing the west. Close up the door with earth taken from a *Pu*-plant, seal the door with *Shubu* and *ginnu* stones.[2]
>
> "Then fasten a torch to the man's thigh, take hold of his hand, and let him pass seven times and again seven times across the encircled water, taken from the Euphrates. When he has crossed it, recite in a clear voice the incantation 'Ea has made, Ea has loosened. Remove the evil, ease the pain (?). Undo the evil knot, Ea be with thee!'"

In order to understand this ceremony we must bear in mind that Ea is the god of the water in general, the main seat of whose cult was at Eridu, at the head of the Persian Gulf. He is the god of humanity, who steps in to relieve man from all kinds of troubles, and through whose element—water—the sick man, in the oldest incantation rituals,

[1] Lines 9-14.

[2] Stones are frequently introduced among the remedies in medical texts, though in many cases the determinative for "stone" is merely an indication, as I am led to believe, after a prolonged study of medical and incantation texts, that the substance is inorganic as against organic substances which are introduced by the sign for "plant." "Plant" and "stone" are thus used in a large conventionalized sense for the two main subdivisions of drugs. See further on this point below, pp. 153-154. The use of stones in medicine takes its rise from the views associated with stones as amulets, supplemented by the medicinal qualities that the powder of certain crushed stones was found to possess.

is cleansed of disease.[1] Ea is also the creator, the one who made man, as well as the water. The passing of the sick man across the water symbolizes, therefore, the release of the sufferer, to be secured through water as the element of the god; while the imprisonment of the poultice in a compartment tightly closed and sealed with earth and sacred stones is to place the demon, who is supposed to have issued out of the body into the poultice, beyond the range of further harm. The association of ideas is of the same order as that implied in a magic ritual described in Leviticus xiv, 1-8, where the demon of the disease,[2] a form of psoriasis, as described in the thirteenth chapter, is transferred to a bird, and the bird bearing the disease let loose. We are fortunate in having a number of pictorial representations of the exorcising of demons of disease in ancient Babylonia and Assyria (fig. 9).

As a third example in illustration of the general character of medical tests, I choose one which the College of Physicians in Philadelphia acquired about a year ago, and which it is my privilege, with the kind permission of the authorities of the Philadelphia institution, to bring before you for the first time. Its special interest lies in the fact that it does not form part of the Nineveh library, but represents a private possession of an Assyrian official who, to judge from the style of the written characters, lived in the seventh century B.C. The name of the owner is given at the close of the tablet, which turns out to be an extract from a large series, covering at least five tablets, and of which portions have been published by the British Museum authorities.[3] By means of a comparison with this publication I have succeeded in restoring the defective portion of the obverse, and in reading most of the badly weathered reverse.[4] The writer evidently extracted for his own private purposes—presumably for his medical practice—such of the directions from the large handbook as seemed efficacious to him. The

[1] By the side of water, fire, being also a sacred element, is prominent in incantation texts as a means of cleansing the sufferer from the disease which has rendered him, as it were, unclean. Hence, by the side of Ea, the fire god Nusku plays an important rôle. Both the *Shurpû* and the *Maklû* incantations series are full of appeals to those two gods.

[2] Known as *ṣara'ath*, ordinarily rendered leprosy, because of the use of the term *lepra* in the Greek translation, but the Greek *lepra* is not leprosy. See an analysis of Leviticus xiii and xiv, by the writer in the *Jewish Quarterly Review*, iv, No 3.

[3] "Cuneiform Texts," &c., xxiii, Pl. 23-50.

[4] The tablet will be published in full by me with a translation and commentary in the *Transactions of the College of Physicians of Philadelphia*. *See* figs. 10*a* and 10*b*, showing obverse and reverse of the tablet.

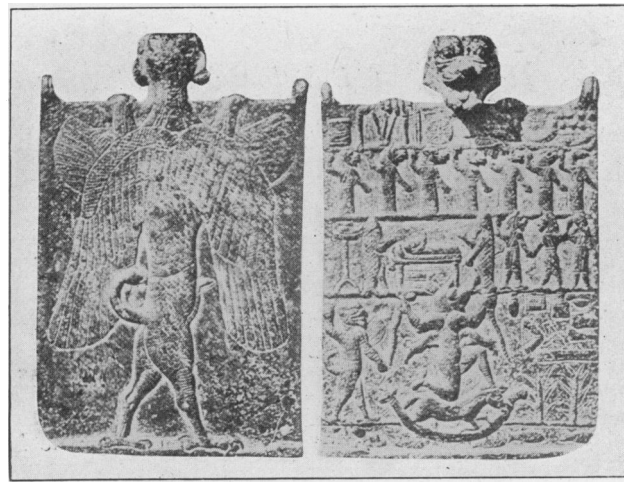

FIG. 9.

Bronze tablet with an illustration of an exorcising ceremony. The one side of the tablet shows a demon standing upright and gazing at the scene depicted on the other side. This scene is divided into five sections. The first section contains the symbols and emblems of the great gods—such as appear on Babylonian boundary stones, where, instead of pictures of the gods, their emblems are depicted to symbolize the protection of the land rights described in the inscriptions on the stones. See many examples in L. W. King's valuable work, "Babylonian Boundary Stones and Memorial Tablets in the British Museum," Lond., 1912. The symbols here depicted from left to right are: (1) Shrine with tiara, the symbol of Anu, the supreme god of Heaven; (2) mace with ram's head, the symbol of Ea, the god of waters and the protector of humanity; (3) lightning-fork, the symbol of Adad (or Ramman), the god of storms and thunder; (4) spear-head, the symbol of Marduk, the patron deity of the city of Babylon and the head of the Babylonian Empire after the union of the Euphrates States, *circa* 2000 B.C., with Babylon as the capital; (5) the double staff (or wedge), the symbol of Nebo, the god of wisdom and of writing; (6) eight-pointed star, the symbol of the goddess Ishtar, identified with the planet Venus; (7) the sun-disk, the symbol of Shamash, the sun-god; (8) the moon-crescent, the symbol of Sin, the moon-god; (9) seven circles, the symbol of Sibitti, the "seven-god," symbolizing, perhaps, the large group of minor deities, seven being chosen as a large and sacred number.

The second division depicts seven demons of disease, often mentioned in incantation texts, and who are described as cruel in aspect and merciless of nature, lying in wait for their victims, striking them unawares, and relentless in their grasp. Each of the demons came in turn to specify some particular disease, so that the group might be called a Faculty of Medical Demons.

The third division shows a sick man with upraised hands lying on a couch, at either end of which stands an exorciser clad in fish-robes as priests of the water-god Ea. The exorcising ceremony is carried out in the name of Ea, who is likewise depicted as a human figure with a fish-skin hanging down his back. The exorciser, as the priest of Ea, clothes himself in the robes of the god as a means of securing the powers of the deity whom he vicariously represents. Behind the one exorciser stands a table with a vessel in which, presumably, some mixture has been compounded to be used in driving the demons out of the body. Behind the other exorciser the demons are depicted as being driven out; they are leaving the patient, who is thus released of his pain and sufferings. The exorcisers are performing some magic rite; the one at the left end is apparently sprinkling the patient with the remedy.

In the fourth section two other demons are depicted; in the centre Labartu, the demon who threatens the life of the lying-in mother and the newborn babe. She is given a particularly horrible aspect, holding a serpent in each hand with swines sucking at her breasts. She kneels on an ass, who is standing in a boat—the scene symbolizing again the departure of this demon, who is perhaps being driven off by the demon to the left. To the right of Labartu various kinds of vessels and jars and other objects are depicted—used in connexion with the medico-magical rites to accompany the incantation formulæ.

In the lowest section the water is represented by swimming fish, with trees growing on the river bank. No fewer than five specimens of such tablets in bronze or stone, scattered in various museums, are now known, an indication of the wide use of such designs as amulets. The one here reproduced is in the *de Clercq* collection in Paris and was first described by Clément-Ganneau (see *Revue Archéologique*, Nouvelle Série, 1879, xxxviii. pp. 337-349) who, however, regarded the scene as an illustration of the nether world. The correct explanation was given by Frank in a monograph, "Babylonische Beschwörungsreliefs," Leipz., 1908, who describes and discusses in detail the other specimens of this scene. *See* further, Jastrow, "Bildermappe," &c., No. 100.

extract is from the first three tablets of the series[1] which dealt with various forms of fever and headaches. The word for fever is "fire," which has an interesting parallel in the Babylonian Talmud—the great ritualistic compilation of the Jews, which, by the way, is full of ancient medical lore, where the question is asked,[2] "What is fever?" to which a Rabbi replies, "A fire of the bones," the same expression, therefore, that is used in Babylonian-Assyrian medical texts. The tablet begins:—

> "If a fever seizes a man, localized in the nerves of the forehead, and it affects his eyes, so that his vision is clouded . . . and he is afflicted with an acute inflammation, and his eyes water, pound one-third of a Ka of powdered *sikhlu*[3] with Khaldappan stone, take one-third of a measure of it for the head that pains; knead with cassia juice, wrap it around [the head], attach it [by means of a bandage], and for three days do not remove."

The remedy consists, as you see, of a compress to be applied to the head, containing some substances to draw out the inflammation, or perhaps to produce a counter-irritation. A number of variant remedies of a similar character follow, including what is particularly valuable, a wash of a certain kind of alkali. "Wash his eyes," the

[1] The obverse is an extract from the first tablet of the series.
Lines 1-6 correspond to "Cuneiform Texts," xxiii, Pl. 23, 1-5 (with some variants).
Line 7 corresponds perhaps to Pl. 24, 18.
,, 8 ,, to Pl. 24, 21.
Lines 9-17 correspond ,, Pl. 26, 4-9.
,, 18-20 ,, ,, Pl. 32, 8-9.
,, 21-26 ,, ,, Pl. 33, 10-13.
,, 27-30 ,, ,, Pl. 34, 29-31.
,, 31-45 ,, ,, missing portions of the first tablet of the series.
The reverse is from the second and third tablets of the series.
Lines 1-3 correspond to Pl. 40, 19-22 (?).
,, 4-7 ,, ,, Pl. 39, 7-9.
Line 8 corresponds ,, Pl. 40, 25.
Lines 9-12 correspond ,, Pl. 42, 16-19.
,, 13-15 ,, ,, Pl. 41, col. ii, 2-3.
,, 16-18 ,, ,, Pl. 42, 8-9.
,, 19-27 ,, ,, Pl. 45, 1-13.
Line 28 missing in "Cuneiform Texts," xxiii.
Lines 29-33 correspond to Pl. 49, 1-5 (third tablet).
,, 34-39 correspond to the obverse of K 4023 (third tablet) (unpublished), col. i, lines 1-6.

[2] Talmud Babli, Berakoth, fol. 32a. In the New Testament, fever is several times referred to—e.g., Matthew viii, 14 (= Mark i, 30 = Luke iv, 38); John iv, 52.

[3] A kind of weed.

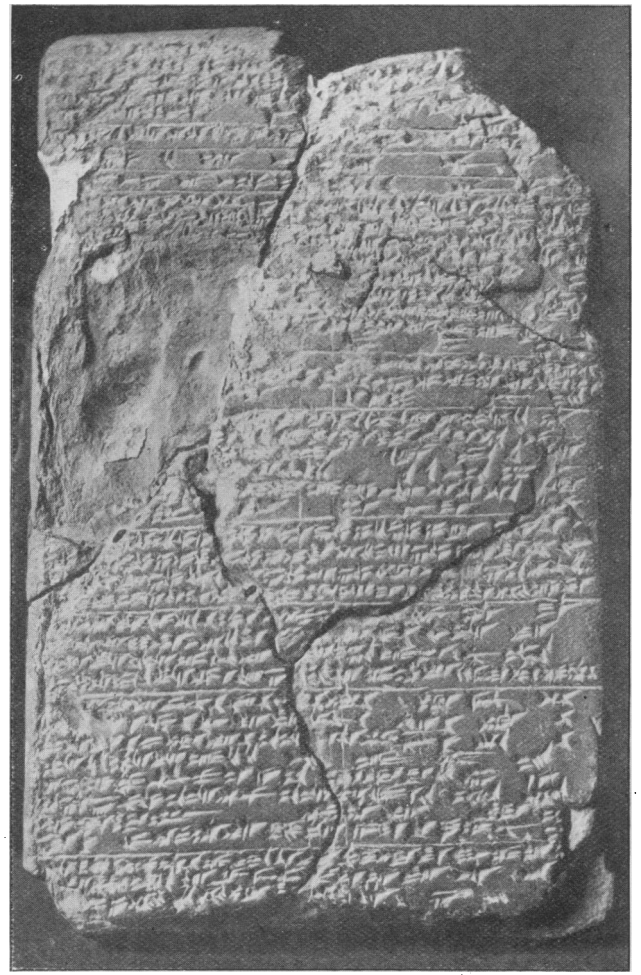

FIG. 10*a*.

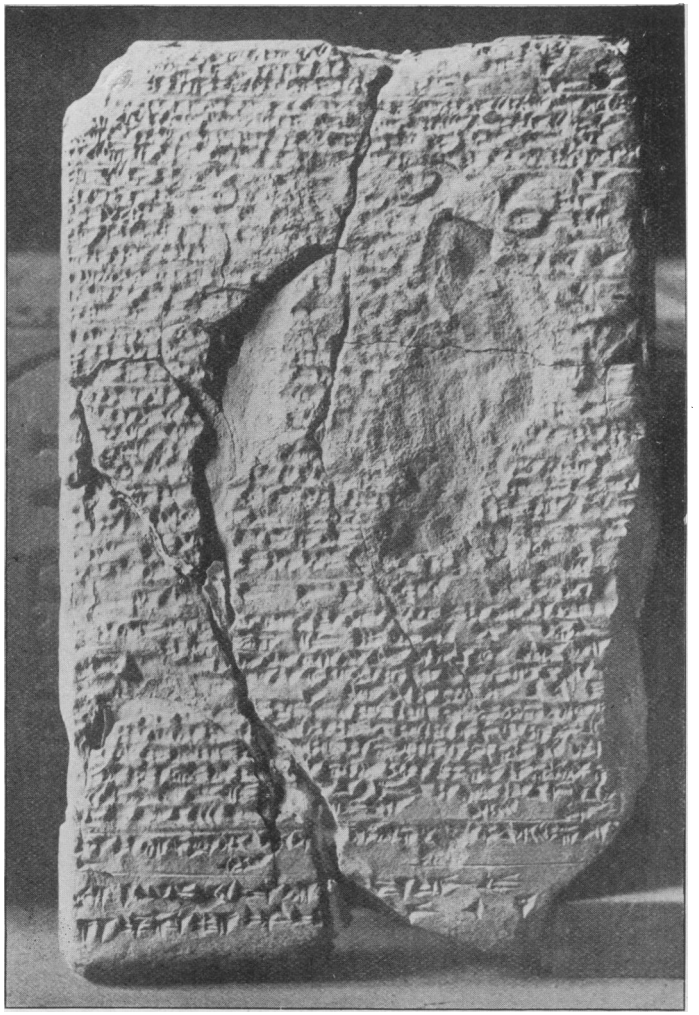

FIG. 10*b*.

Photograph of obverse and reverse of an Assyrian medical tablet dating from about the seventh century B.C., in the possession of the College of Physicians of Philadelphia, by whose kind permission the tablet is here reproduced. The tablet, which was purchased for the College of Physicians, is said to have been found at Kaleh-Shergat, the site of Ashur, the ancient capital of Assyria.

text reads,[1] "until the tears cease to flow; take a bandage and tie it on."

> "After that put him in a closed room; boil juice of kiptu,[2] strain it (?) to a Kan-Shar vessel,[3] and in the evening and morning rub his head."

Further directions are given to put a poultice of various ingredients around his head, to tie it with a strip of a coloured thread, to rub oil on his head, to keep him in a sheltered compartment, and to continue this treatment for three days. Despite the difficulty of identifying all the drugs mentioned, enough ingredients of the various poultices are clear, such as fat, various salt and alkalies, to show that the main thought was to reduce the swelling and by means of a wash, or ointment, to stop the flow from the eyes. The careful treatment—to keep the patient in a dark or sheltered compartment, so as to remain perfectly quiet, should be especially noticed, as well as the accurate indications to keep the bandage in place by means of a strip of some kind.

Our text then passes on to headaches, always regarded with great seriousness in antiquity, just because of their common occurrence. There is a special demon of headaches, *Ti'u*, whose functions cover the entire range of head troubles from an acute pain to insanity. The Talmud, which I have already quoted, has a significant saying about headaches and other ills[4]: "Any sickness, except intestinal trouble, any pain except heart spasms, any ache except a headache," and it adds rather cynically, "Any malevolence except that of a woman." The text prescribes[5]:—

> ["If a man's head burn,] his head oppresses him, particularly the vein of his temple, compound" (text defective) "with oil; wrap it around his head, press it on tight, and do not remove for three days."
>
> "If *ditto*, take one-third of a Ka of powdered juniper[6] wood, 10 shekels[7]

[1] Lines 12-14 = "Cuneiform Texts," xxiii, Pl. 26, 6-7.

[2] She-gig = *Kiptu* (Meissner, *ibid.*, No. 5492)—some kind of grain in a decaying state as indicated by its occurrence among foul and ill-smelling substances ("Cuneiform Texts, &c.," xiv, Pl. 42, 29).

[3] Perhaps a mortar.

[4] Talmud Babli, Sabbath, fol. 11a.

[5] Obverse lines 18-26 = "Cuneiform Texts," xxiii, Pl. 32, 8-10, and 33, 10-14.

[6] *Shur-man* = Aramaic and Syriac *shûrbîna*. (*See* Löw, "Aramäische Pflanzennamen," p. 387 *et seq.*)

[7] Here used as a weight.

of powdered Cyperus,[1] 10 shekels of Cyprus,[2] 10 shekels of chicory (?),[3] 10 shekels of powdered cassia, 10 shekels of Tig-Gal flour,[4] 10 shekels of Tig-Tur,[5] 10½ shekels of dates, 10 shekels of thorn plant,[6] 10 shekels of good standing wine,[7] 10 shekels of powdered raddish;[8] mix them together, knead with wine into a solid paste, crush it and strain it, take one-third of a measure of it for the head which pains, knead it with cassia juice, wrap it around, attach" (by means of a bandage), "and *ditto*."[9]

Towards the close of the text there is a particularly striking relapse to the older form of sympathetic magic in the treatment of disease, and so undisguised a reference to the belief in a demon as the seat of disease, that I cannot resist the impulse to quote.[10]

"If a man's forehead is affected and the demon in the man's body cries out[11] and does not depart, is not restrained through bandage or

[1] Man-du to be read *suadu*, according to Meissner, "Assyrische Ideogramme," No. 3566, compared with No. 3544. In our text the word is introduced by the sign *Rik* placed before "green" plants, but in the parallel passage, "Cuneiform Texts," xxii, Pl. 33, 10, by the sign *Gish* placed before "trees," though in Pl. 37, 12, the sign *Rik* is found. There are many other instances of such variations in the use of determinatives. In this instance the variant indicates that a tree is meant. To be identified with Syriac *se'dā*, as suggested by Holma, "Beiträge," &c., p. 78.

[2] Rik-Li = *burâshu* (Meissner, No. 3535), the common name for cypress in various Semitic languages. The sign for tree is frequently attached to the combination, thus Gish-Rik-Li—i.e., a species of an evergreen tree. (*See* Löw, *ibid.*, p. 82 *et seq.*)

[3] Gish-Li Gam-Gam to be read *kukru*. I venture to identify it with chicory (Latin cichorium, Greek κίχωριον), which Pliny ("Nat. Hist.," xix, 39, and xx, 29) traces back to Egypt. If this be correct, the plant may have been imported into Babylonia from Egypt, though this is unlikely.

[4] Tig-Gal, frequently mentioned in medical and divination texts, designates some variety of grain with a large stalk.

[5] Tig-Tur, "small stalk"—another variety of grain.

[6] Zag-Khi-li = *sik-hlu* (Meissner, *ibid.*, No. 4658)—a weed of some kind.

[7] Bi = *shikaru*, "unmixed wine," followed by U-Sa, equivalent to Ush-Sa (so in our text, obverse, line 40) = *emêḍu*, "standing," followed by the sign for *damḳu*, "good."

[8] She-Din = *puglu*, evidently identical with Aramaic and Syriac *puglā*, "raddish" (Raphanus Sativus). (*See* Löw, *ibid.*, p. 309.) The compound sign is identical with Meissner, No. 9706—a suggestion that I owe to Professor Ungnad.

[9] Repetition sign to indicate, as in the preceding paragraphs, "for three days do not remove."

[10] Rev. 29-33 = "Cuneiform Texts," xxiii, Pl, 49, 1-5; *see* also Frank in the *Zeits. f. Assyriologie*, xx, p. 438.

[11] The belief in demons taking possession of a man's body and *crying out* persists till New Testament times. See the instances recorded in Mark i, 23 (= Luke iv, 33), and Luke ix, 39, and the discussion of these and other passages in Ebstein, "Die Medizin im Neuen Testament und im Talmud," p. 57 *et seq.*

incantation (that is, if all remedies fail), then slaughter a captured *Kurkū* bird, squeeze out its blood, takes its . . . . , its fat and the skin of its crop (?), burn it in the fire, mix cedar with the blood, and pronounce the incantation 'evil finger of man' three times," &c.

We are reminded of the sacrificial regulations in the Pentateuchal codes which prescribe in the case of one to be purified of disease the burning of parts of the animal offered as an atonement, while the blood is to be used to touch the right ear, the right thumb and the right large toe of the patient. The same rite is to be performed with the oil as an accessory to the sacrifice, and what remains of the oil is to be put on the head of the sufferer.[1] Our text thus throws an interesting light on Biblical rites which similarly rest on an endeavour to exorcise the disease and to make the sufferer immune against demoniac possession through being touched with the blood and with oil.

The examples given will suffice to show the general character of medical treatment among Babylonians and Assyrians at its best and worst, showing the hightest level reached, as well as the persistence of older methods. It is significant that even our physician, who extracted the larger handbook, included the old magical rite in his copy as a remedy to be resorted to in the last instance, which reminds us that even at the present time it is not uncommon for the quack, the herb doctor and the patent medicine man, who may be regarded as the modern representatives of the old Babylonian exorcisers, to be appealed to by patients in moments of despair, when rational remedies do not seem capable of affording relief.

On the basis of the examples furnished, we will be prepared to find a large number of diseases introduced into the medical texts, but what is more, we also find differentiations between various aspects of a disease having its seat in some particular part of the body. An enumeration, which does not aim at completeness, shows us colds, indigestion, vomiting, diarrhœa, cramps, rheumatism of the joints, neuralgia, hæmorrhages, eye troubles, heart diseases, bilious attacks, and various stages of jaundice. The diagnosis in many cases is detailed, and reflects considerable care in observing symptoms. A case of indigestion, accompanied by vomiting, is described as follows[2]:—

[1] Leviticus xiv, 13-18.

[2] K 191, &c., i, 26-27 (Küchler, "Beiträge," &c., p. 3).

"If a man has a pain in his stomach and cannot retain food, which comes back through the mouth, and his bowels (?) are loose, and he vomits and his flesh is inflated and there is wind rumbling in his anus, and diarrhœa has set in, take to cure him," &c., &c.

Naturally a condition of this kind may not only be due to various causes but may be the accompaniment of various disorders. The medicine of Babylonia-Assyria reaches its limit in the description of the symptoms, but, on the other hand, this lack of differentiation in the diagnosis is compensated for by the large number of remedies proposed, which it is fair to presume reflect the experience spread over long periods and which taught the physicans to be prepared for various causes leading to the same or to similar manifestations. Swelling, or distension of the stomach, with cramps and an inclination to vomit, is described as follows[1]:—

"If a man's stomach is distended, and at the same time the muscles are contracted, and he is inclined to vomit, take," &c., &c.

A sour stomach with rumblings and vomiting is described as[2]:—

"If a man [has acidity (?) and his stomach] is swollen and emits cries,[3] brings back food and drink, take," &c.

More briefly we find the case[4]:—

"If a man's stomach is full of acid."

The diagnosis of a more complicated form of stomach trouble involving the chest and liver reads[5]:—

"If a man's chest is affected, the stool is like urine" (i.e., a very thin, watery stool), "his throat hurts him in speaking, he vomits—all the man's insides are affected, take," &c., &c.

Still more detailed is the description of a generally disordered system, accompanied by fever.[6]

"If a man, without eating anything, is inclined to vomit" (i.e., he is nauseated), "has much phlegm, the saliva that flows from his mouth is

[1] K 71b, &c., ii, 17 (Küchler, *ibid.*, p. 22).

[2] K 71b, &c., ii, 58 (Küchler, "Beiträge," &c., p. 26).

[3] The cry of the demon is again meant, as above, p. 141.

[4] K 71b, &c., ii, 14, 28 (Küchler, *ibid.*, pp. 20 and 22).

[5] K 71b, &c., iii, 55-56 (Küchler, *ibid.*, p. 32).

[6] K 61, &c., i, 27-30 (Küchler, *ibid.*, p. 44).

bitter" (i.e., acidity in the stomach), "his face glows, his stomach is distended, his body is shrunk (?), his limbs (as) on a cold day shake[1] (?), food and drink cause pain, he drinks a great deal of cold water, he vomits, wind rumbles in his anus, the muscles of his body ache and seem weak, the fleshy parts are painful, whatever he eats does not agree with him, take," &c.

Liver troubles, so common among men and animals in southern climates, naturally play a prominent part in the general texts. The general term for an affection of the liver is "gall sickness," and the chief aim of the physician appears in such cases to have been to secure an opening of the bowels, so as to relieve the system of the defectively assimilated food. An unusually large number of remedies, however, are set forth, pointing, as I venture to think, again to the recognition of many varieties of gall troubles, even though this does not appear in the diagnosis.

Among symptoms of "gall sickness" we find pains in the head, neck, the middle body, and the feet, and that the face assumes a sallow appearance. A more detailed diagnosis of an internal disturbance placed with diseases of the liver reads[2]:—

"If, while eating, a man has a pressure at the pit of the stomach, accompanied by heartburn,[3] and the patient vomits gall, that man suffers from severe *tugatu*"—a designation which escapes interpretation for the present.[4]

The indications of the disorder leading to jaundice are appropriately described as accompanied by "yellowness of the eye."[5] Jaundice itself bears the name *amurrikanu*, which is the exact equivalent of our modern term, and is also the name which occurs in the Talmud.[6]

We find in the medical texts a number of descriptions indicative of various stages in jaundice.[7]

[1] I.e., he has chills.

[2] K 61, &c., ii, 23-24 (Küchler, *ibid.*, p. 50).

[3] Literally "heart-fire," the same term, therefore, that is still used in modern parlance.

[4] See Holma, "Beiträge," &c., p. 8, note 1.

[5] E.g., K 61, &c., iii, 4, 6; iv, 16, 17 (Küchler, *ibid.*, pp. 54-58).

[6] *Yerakôn* (see Jastrow, "Talmudic Dictionary," *s.v.*); cf. K 61, &c., iii, 7; also "Cuneiform Texts," xiv, Pl. 26 (K 14047), list of medicinal plants for *amurrikanu*, *akhkhazu* (an advanced form of jaundice), and Ṭu (bowel [?] trouble); Pl. 48 Rm., 328, rev., 10-13, prescription for *amurrikanu*. See also Pl. 37 (Rm. 357).

[7] K 61, &c., iii, 4-5 (Küchler, *ibid.*, p. 54).

"If a man is affected with yellowness of the eye, and the disease spreads into his eye, causing a flow of tears . . . his abdomen is swollen, he gives back food and drink, that man is affected all over by the sickness, and will die."

No medicinal treatment is prescribed in this case nor in the following[1]:—

"If a man has yellowness of the eye, his head, his face, and all his body is affected to the root of his tongue, which is affected, it is hopeless (?), he will die."

A simple definition of jaundice is added as a means of recognizing the disease[2]:—

"If a man's body is yellow, his face yellow, his flesh is steadily shrinking, that is *amurrikanu*."

Another designation of the disease in an advanced form is *akhkhazu*, a term which, it will be recalled,[3] is personified as the demon of a specified disease. The diagnosis reads[4]:—

"When a man's body is yellow, his face is yellow and black, the root of his tongue is black, that is *akhkhazu*."

The dark colour at the back of the tongue was apparently looked upon as an important symptom of an advanced stage of the disease; though I have been unable to satisfy myself that this symptom is characteristic. It may be that a thickly coated tongue is meant.

The treatment prescribed consists of drinking in wine a certain kind of "serpent of the field" that has been baked; which suggests a magic rite rather than a medicinal mixture. Very significantly the customary phrase "he will recover" is not added; instead, an expression is introduced which is evidently intended to convey the thought that relief will be afforded,[5] but no complete cure. It is in keeping with this view that *akhkhazu* in a chronic stage is generally set down as hopeless.[6]

[1] *Ibid.*, line 6.

[2] *Ibid.*, line 7.

[3] See above, p. 114.

[4] K 61, &c., iv., 26 (Küchler, *ibid.*, p. 60).

[5] *Akhkhazu sha libbishu* Si-Di (am) [=*ishshiram*]—i.e., "the *akhkhazu* of his insides will be better."

[6] K 61, &c., iv, 45-46; also 43-44 (Küchler, *ibid.*, p. 64). In line 30 no outcome is indicated, and in line 31 we must probably supply Si-Di (*am*) as in line 26, but line 28 reads "he will recover."

"When a man has *akhkhazu*, his head, his face, his whole body and even the root of his tongue is affected, the physicians should not treat him [literally, 'should not bring his hand to him'], that man will die, he cannot recover."

Coming to eye diseases, which were so common at all times in the Orient, as they still are at the present time, we find a number of incidental references in connexion with headaches and fevers.[1] No doubt among unpublished fragments, many will be found dealing specifically with eye troubles.

["If the right side of a man's forehead] is affected, and the tears of his right eye are involved,[2] take bits of powdered turnip seed[3] mixed together with . . , pour cassia juice over it, apply to the forehead, and he will recover.

"If the left side of a man's forehead is affected and the tears of his left eye are involved, take bits of oleander,[4] crush and strain, pour into heated wine, apply to his forehead, and he will recover.

"If both sides of his forehead are affected, and the tears of both eyes are involved, take bits of oleander, cassia, powdered turnip, finely cut radish, mix together in a Kan-Shar vessel, pour cassia juice (over it), bind both sides of the forehead, and he will recover."

Cases of bloodshot eyes[5] are mentioned in connexion with headaches, and again a distinction is made as to whether the right or left eye is involved.

A headache on the right side with a swelling in the right eye and

[1] "Cuneiform Texts," xxiii, Pl. 42, 20-25.

[2] I.e., the tear-sac is choked up.

[3] She-Sa-a, with a sign indicating a flour made of it, is to be read *laptu*, as shown by Meissner, *Zeits. f. Assyriologie*, vi, p. 295, and is, as the Aramaic and Syriac equivalent *lapta* indicates (Löw, *ibid.*, p. 177), the common turnip (*Brassica Rapa*). It is one of the most common ingredients in the medical prescriptions of the Babylonian and Assyrian "healers"—generally, as in our passage, in powdered form to aid in making a paste.

[4] Khar-Khar = *khaldappanu*, which, as Küchler ("Beiträge," &c., p. 85) suggests, is to be identified with Talmudic and Syriac *hardûp*, "Oleander" (Löw, "Aramäische Pflanzennamen," p. 131), in which languages it is probably a loan-word from the Babylonian. The Greek *Rododaphne* would then be a further corruption from *Khaldappanu*, superinduced by a species of popular etymology to connect the word with *rodon*, "rose," and *daphnē*, "laurel." The variety of forms under which the word appears in Talmudical passages, including *hardaphnin*, which comes close to *Khaldappanu*, speaks in favour of its being a loan-word to be carried back to a Babylonian origin.

[5] "Cuneiform Texts," xxiii, Pl. 43, 26-29.

abundant flow of tears is put down as "Due to the hand of a demon,"[1] and the remedy prescribed is to "rub the head with finely powdered bits of human bone mixed with cedar oil." A similar explanation is offered for headaches accompanied by vomiting and swelling of both eyes, while a persistent headache lasting from sunrise to sunset is ascribed to the machinations of a demon or a sorcerer, as the case may be.[2]

A distinct case of an injury to the eye, with a detailed account of rapid progress, is referred to in a letter of a physician, Arad-Nanâ to Ashurbanapal, found in the Archives Section of the royal library.[3] The patient is a little son of the king about whose condition the father seems much worried. The nature of the injury is not disclosed, but indications point to a wound above or below the eye which has been discharging pus.

> "Arad-Nanâ to the king my Lord, Thy servant Arad-Nanâ. Hearty greetings to the king, my Lord. May Ninib and Gula[4] grant happiness and health to the king my Lord.
>
> "Hearty greetings to the little chap whose eye causes him trouble. I put a bandage[5] on his face. Yesterday, towards evening, I took off the

[1] "Cuneiform Texts," xxiii, Pl. 44, 5-6. The sign used—as also above, p. 140—designates the ghost who, according to common beliefs, was a demon who had the power of taking up his seat in a living person and causing no end of pain and mischief. Diseases thus directly ascribed to ghosts are very frequently referred to in medical texts—e.g., K 4075, 4609b (with prescriptions), 10658, 11772, 14166, according to Bezold's "Catalogue of the Kouyunjik Collection," &c.

[2] "Cuneiform Texts," xxiii, Pl. 44, 7-9, *kât alpi*, "hand of an ox," where, however, *alpu*, as in Boissier, "Documents Assyriens relatifs aux Présages," p. 245, line 19, is to be regarded as the name of a demon, having the head or shape of an ox. Hence the sign for an ox has as one of its equivalents *etimmu*, which, originally a ghost, becomes a generic name for a demon. See preceding note and cf. Brünnow, "Classified List," No. 5738, and Meissner, "Assyrische Ideogramme," No. 4038, where the same sign equals *mâtu*, "to die."

[3] Sm. 1064, published by R. F. Harper, "Assyrian and Babylonian Letters," iv, No. 392. We owe to Professor Harper the publication of the extensive and exceedingly valuable official correspondence in Ashurbanapal's library covering all possible subjects. Up to the present Professor Harper has brought out eleven volumes of such texts. Included in the collection are quite a number of letters from physicians or upon medical subjects—e.g., (the numbers according to Harper's edition), Nos. 108-111, 157, 248, 391, 1157.

[4] In these medical letters the gods invoked in the greeting, with which a letter invariably begins, are Ninib, the god of healing, and his consort Gula. In other letters the gods most commonly invoked are Marduk and Nebo (or in reversed order), though the moon-god, Sin, and his consort Nin-gal are sometimes substituted for Marduk and Nebo. Frequently, however, a longer list of deities is introduced in the greeting.

[5] The word used is *ta'alitu*, literally "a covering." Johnston, in his admirable monograph on "The Epistolary Literature of the Assyrians and Babylonians," *Journal of the American Oriental*, xviii and xix, has discussed this and some other medical letters.

bandage that had been applied, removing also the dressing below, and there was blood on the dressing as much as the point of the little finger. To which ever one of thy gods this is due, his command has surely been heeded.

"Hearty greetings. Let the king my Lord, rest assured; in seven or eight days he will be well."

Hardly any comment is needed on this very explicit letter. The physician has placed a dressing on the eyes containing no doubt some ointment, and he has fastened the dressing by means of a bandage around the face of the patient. He reports that bandage and dressing were removed to observe the healing process; that he found the wound almost healed. Modestly, or shall we say in accordance with current beliefs, he ascribes the unexpectedly rapid cure to the intervention of some god, and confidently predicts a complete recovery within a week. This is only one of many letters of physicians found in the extensive collection of official reports to the kings, and since through such reports we enter, as it were, into the physician's workshop and can observe the healer, as he is called,[1] in his relations to his patients, I venture to place a few more before you, which will also lead us to the next point to be considered—the methods of treatment. This same Arad-Nanâ writes to the king to reassure him regarding an eruption of some kind with which his royal master has been affected. After the usual salutations Arad-Nanâ writes[2]:—

"As to the eruption (?)[3] concerning which the king has made inquiry . . .[4] for the rest of the time he should take a complete rest. Let the king apply[5] to his chin. Let the king draw pure water with which to thoroughly wash the hands of the king, my Lord. Do not worry. Soon the eruption will pass away."

A rest cure is here ordered as part of the treatment, and if my interpretation is correct, the king is cautioned to wash his hands

[1] *Asu*, a word which has passed into all Semitic languages (Hebrew, Arabic, Aramaic and Syriac) in the same sense, evidently under the influence of Babylonian-Assyrian medicine.

[2] K 576 (Harper, No. 110).

[3] *Issadi*, an unknown word which from the context appears to be a boil or an eruption on the face.

[4] Text defective for several lines.

[5] *Lip-pi-shi-ish* from *pashâshu*, the technical term for rubbing an ointment or salve on any part of the body. Evidently Arad-Nanâ has prescribed some ointment for the disease from which the king is suffering.

thoroughly after he has put the ointment on his face, more particularly the chin, where the seat of the trouble appears to have been.

There is a very human touch in the criticism passed by the same Arad-Nanâ in another letter upon a wrong treatment apparently prescribed by a colleague. It is again the king's son, who this time is suffering from hæmorrhages of the nose. Whether it is the same son we cannot tell, as names are not mentioned. Arad-Nanâ has apparently been called into consultation to ascertain why the bleeding does not stop. He reports as follows [1]:—

> "To the king my Lord, thy servant Arad-Nanâ, Hearty greetings to the king, my Lord. May Ninib and Gula grant the king, my Lord, happiness and health.
>
> "Hearty greetings to the king's son. The treatment which we prescribe for him is to be given every two-thirds of a double hour during the day.[2] . . . . . .
>
> "In regard to the bleeding of his nose about which the Rab-Mugi [a high official] has reported to me that yesterday toward evening there was much bleeding, those dressings are not properly applied; they have been placed upon the alæ of the nose, obstructing the breathing, while at the same time the blood flows into the mouth. Let the nose be plugged up to the back so that air will be held off, and the bleeding will cease. If it please the king I will come to look at it to-morrow. Meanwhile may I hear good news."

Evidently an attempt was made to stop the bleeding by merely plugging the alæ, the result of which was that the blood flowed backwards and came out through the mouth. As the spot from which the bleeding came was not covered, Arad-Nanâ's advice is to plug up the nose completely.

In a third letter [3] Arad-Nanâ assures the king that he need not worry about the condition of his son, whom he here mentions by name—namely, Ashur-mukin-palû'a. The text of the first part of the letter after the customary greetings is defective. From the reverse of

[1] *Harper*, No. 108 (K 519). *See* Johnston, "Assyrian Epistolary Literature," p. 163 *et seq.*, and von Oefele, "Keilschriftmedizin in Parallelen," pp. 22-23.

[2] The Babylonians and Assyrians divided the full day into twelve double hours. As a survival of this method based on the sexagesimal system, we still have only twelve numerals on our watch dials and divide day and night each into twelve hours, instead of counting the hours of a full day consecutively from one to twenty-four, as indeed is now done in the time-tables of Belgian railways. Every two-thirds of a double hour would therefore be every eighty minutes. The following four lines are obscure.

[3] Harper, No. 109 (K 532).

the tablet we learn that the king had been suffering from a toothache—perhaps an ulcerated tooth. This portion reads as follows:—

> "As for the cure of the tooth, about which the king has sent word to me, I am very happy to learn that the tooth about which the king has sent word to me is indeed healed as the king has informed me. Your worry is uncalled for that I should go to see Ashur-mukin-palû'a. I have already been to seen him. But I intend to come again to inquire about the health of the king. Meanwhile let the king continue the treatment for a month—then there will be no relapse (?)."[1]

Arad-Nanâ has been treating both father and son. He has cured the former but not the latter; and the king is worried about his son's condition. The physician says that the king need not urge him to see the prince, that he is attending to the case, but that the king should look after his own health and continue the treatment prescribed.

The association of ideas in our language between a "patient" and "patience" speaks well for the reputation acquired by sufferers, but it is not often justified. It would probably be nearer to the fact to make "patient" a synonym of "impatience"—and naturally one's impatience is reserved for the physician. Some member of the royal court is ill and the king has sent an inquiry to the physician, Ikkaru by name, which evidently contained a reproach that the cure was not proceeding as rapidly as the patient and his royal chief hoped for. Ikkaru replies as follows[2]:—

> "To the king, my Lord, thy servant Ikkaru. Very hearty greetings to the king, my lord. May Nebo and Marduk bless the king, my lord! May Ninib and Gula[3] grant happiness and health to the king my lord. As for Iratti,[4] about whom the king my lord [has sent word to me], I am treating him and taking great trouble about him. He was not able to come as yet,[5] for the king my lord ought to know that he is a sick man.
>
> "The drugs[6] of the king for the cure [of Iratti (?)] have not yet had an effect. The wash[7] will have to be applied twice and three times, before he will be relieved."

[1] Last word of the text is doubtful. My rendering is merely a guess.

[2] Harper, No. 248 (K 502).

[3] Our writer, it will be observed, wrote both Nebo and Marduk—the customary salutation—and then adds the specific invocation of the physician.

[4] No title is added, so that we do not know what rank he occupied, but it is evident that he must have stood close to the court.

[5] The king has evidently asked the physician why Iratti does not come to the court.

[6] *Ur-ki-te*, literally "herbs," which is here used generally for drugs, just as is the case in the medicine of the Middle Ages, though he uses other remedies than herbs.

[7] *Mar-khi-ṣi*, the medical term for a "wash," so frequently referred to in the medical texts.

My last example of this medical correspondence which throws such a valuable light upon the standing of the physician at the Assyrian court strikes a familiar note, one that will arouse your sympathy for your colleague of 2,600 years ago. The king is suffering from an attack of rheumatism which seems to have been very persistent and refused to yield to treatment. Naturally, the blame again is put on the physician — the same Arad-Nanâ — and curiously enough the latter confesses that he had not understood the nature of the trouble, but that he now feels certain of getting at the root of it. Here is what he writes[1]:—

> "The king my Lord continues to declare 'the state of this sickness of mine thou dost not recognize, thou dost not bring about a cure.' Now I confess that hitherto I did not understand this rheumatism,[2] but now I seal this letter to send it to the king my Lord. Let it be read to the king my Lord and properly understood. When it reaches the king my Lord let a physician . . . carry out the accompanying directions. Let the king apply this liniment.[3] If the king does this, soon this fever will leave the king my Lord. A second and a third time this oil liniment should be applied to the king my Lord. The king must see to this. If it please the king let it be done in the morning. This disease is in the blood. Let them bring the king a *ṣilbani*,[4] as was twice done already, and let it be vigorously done. I shall come to inform myself, and as soon as the perspiration flows freely from the king, my Lord, I will send to the king, my Lord, something to apply to the king's neck. With a salve which I shall send the king let the king be rubbed at the appointed time."

The treatment of rheumatism by means of liniments and salves will appeal to us as natural, but the number of such remedies prescribed—no fewer than three kinds being specified—raises a suspicion that Arad-Nanâ, despite his assurance that he had now grasped the nature of the disease, was continuing his experiments in the hope of striking an efficient combination of drugs.

[1] Harper, No. 391 (83, 1-18, 2); translated and discussed by Van Gelderen, in "Beiträge zur Assyriologie," iv, pp. 520-521.

[2] Literally "sickness of the muscles."

[3] *Mar-khu ṣu*, the same word as above, p. 150, note 7. Evidently the wash or liniment was sent with the letter.

[4] *Ṣilbanu* is dried liquorice root (cf. Löw, *ibid.*, p. 378), but in this passage a liniment or a massage treatment appears to be intended.

[5] *Napshaltu*, a word of frequent occurrence in medical texts to designate a salve or ointment.

Let me conclude this portion of my subject by reading to you the symptoms of a disease in one of the medical texts so perfectly described as to require no further comment, except to note an absence of a sense of humour on the part of the compilers of medical texts, who diagnose a "drunk" with the same seriousness as a case of jaundice. Sandwiched in between a description of bowel and chest troubles we read[1]:—

> "If a man has taken strong wine and his head is affected and he forgets his words and his speech becomes confused, his mind wanders and his eyes have a set expression; to cure him take licorice, Shi-man-plant, beans (?), oleander, and so forth [eleven drugs in all are enumerated]; to be compounded with oil and wine before the approach of the goddess Gula[2] [i.e., in the evening] and in the morning before sunrise, and before anyone has kissed him let him take it, and he will recover.

A German scholar, commenting on this passage, soberly suggests that it points to the custom in Babylonia and Assyria to kiss one another in the morning. Perhaps I am mistaken in thinking that the compiler of the prescription was entirely devoid of a sense of humour, and that he added this touch as a suggestion that to kiss a man who comes home in such a condition might not be an unalloyed pleasure. At all events, the naïve description of the unmistakable symptoms of a spree is delicious as well as true to nature.

It is almost humiliating to be obliged to confess that of the eleven drugs introduced in this prescription, despite the fact that six are of very common occurrence, we cannot with any degree of certainty identify more than three of them.

V.

This brings me to the next point to be briefly considered—medicinal remedies. There are considerably over a hundred drugs included in the medical texts so far published. That the number in use, however, was much larger is shown by long lists of drugs found in the text-book division of the royal library and which furnishes, therefore, a most valuable supplementary source for the study of Babylonian and Assyrian medicine. These lists, of which we now have a large number at our disposal, consist of enumerations of plants, herbs, weeds, thorns,

[1] K 71b, &c., iii, 51-54 (Küchler, "Beiträge," &c., pp. 32-33).

[2] The phrase, whatever its origin, is a synonym of the "rising of a star" (above, p. 132, note 5) as a sign of evening.

woods, roots, juices, and stones, with explanatory comments attached, indicating at times the phonetic reading of the signs, at times the class of substances to which the names belong or the genus of which they are a species. Other explanations attached to the lists indicate the use to which the drugs are to be applied, and with what other substances they are to be compounded. The lists were evidently drawn up by the priests as aids to the study of medicine, to be used in the temple schools for the training of those who were to take their place in the community as "healers." The number of drugs is thus increased to the volume of an extensive pharmacopœia, comparing favourably in extent with modern compilations.

Over three hundred substances are mentioned in these lists so far as published. The largest share is taken by plants and shrubs, and among those that may with greater or less certainty be identified are mint, liquorice, rape or colewort, coriander, cummin, carraway, cassia, onions, leek, radish, mustard, lily, jasmine, nard, mushroom, colocynth, portulaca, anise, rocket, Star of Bethlehem (ornithogallum) and cynoglosson (which, as already pointed out,[1] bears a name that is an exact equivalent of the Greek term, "grain," "wheat"); and a large variety of reeds and thorny plants. Indeed, so predominating is the use of plants—the seeds, the juices, and the leaves being utilized—that the sign U for plant, which is to be read for *shammu*, becomes the general determinative placed before all substances used as drugs in these long lists.[2] Quite irrespective whether the drug is a wood, a shrub or a vegetable, it is introduced by the sign *shammu*, which thus becomes the general term for drug, and passes over in this sense into the Arabic, Syriac, Aramaic and Hebrew—probably under the direct influence of Babylonian and Assyrian medicine. Next to plants we have a large number of trees and shrubs, the roots, twigs, bark, sap and seeds of which were used. Among those which may be identified are the cedar, the cypress (though there is also a cypress plant), the tamarisk, the myrtle, the willow, the fig, and the olive. Thirdly, we have many mineral substances including various alkalies and salts, and lastly many stones,[3] which were crushed and used as

[1] Holma, in his "Beiträge zum Assyrischen Lexikon," pp. 57-94, has succeeded in adding considerably to the identifications of Babylonian-Assyrian plant-names. The little volume is a most valuable contribution to the medicine of the Babylonians and Assyrians. Above, p. 133, note 4.

[2] A large number of such lists are published in "Cuneiform Texts," xiv, Pl. 19-48; *see* also "Cuneiform Texts," xi, Pl. 45, 46. *See* fig. 11 for a specimen.

[3] *See*, e.g., "Cuneiform Texts," xiv, Pl. 14-17.

ingredients in concoctions, but more particularly in ointments and salves. It is a fair inference that the use of stones as amulets was also a factor in their introduction into medicinal compounds, for the stones mentioned include those to which a special significance as protection against demons was ascribed. These lists of stones are introduced by a sign to be read *Na* in Sumerian, and *abnu* in Babylonian. A prolonged study of the *shammu* and *abnu* lists has convinced me that the Babylonians intended to indicate by the signs for these two terms the broad distinction corresponding to our organic and inorganic substances.[1] If this view should turn out to be correct, it would lead us in our further attempts to identify terms introduced in the long lists of stones beyond the purely mineral kingdoms, just as the plant list extends beyond the scope of the vegetable kingdom because of the generic use of the sign for plant to designate any kind of a drug. The list of drugs thus grouped into two large classes constitute adjuncts to the medical text-books proper and serve the very important purpose of a secondary source. It is interesting to note further in these lists attempts at a scientific or quasi-scientific grouping of drugs that have some elements in common. So we find a group of substances placed in a class of cultivated plants followed by a list of thorns, woods and shrubs that grow wild.[2] The lists also show us the extent to which drugs were imported from other countries. For example, among the thorns there are mentioned four varieties of *dadanu*,[3] one as growing in Subari (an old name for Assyria),[4] two—a much larger variety—in Kinakhkhi (which is the Babylonian form of Canaan), and a fourth in Melukhkhi (which, according to some scholars, designates a section of the peninsula of Sinai, but according to others is to be sought along the African coast).

Of special interest are lists of drugs with indications of the diseases for which they are to be used[5] or of the manner in which they are to

[1] The detailed proof of this thesis must be left for another occasion. *See* incidental remarks in connexion with the explanations attached to figs. 11-16.

[2] "Cuneiform Texts," xiv, Pl. 21, col. 5; *erishtum* (cultivated) as against *ashagu* (wild growing weeds).

[3] *Ibid.*, lines 18-22.

[4] Also mentioned as the provenance of a plant in "Cuneiform Texts," xiv, Pl. 36 (K 10126, &c.), line 8, and Pl. 31 (K 4586), line 7, where the name is written in the more common ideographic fashion.

[5] E.g., "Cuneiform Texts," xiv, Pl. 23 (K 9283 and K 254); 26 (K 14047); 30 (Sm. 698); 36 (81, 2-4, 267); 37 (RM. 357); 43 (Sm. 60, &c.); probably also 24 (K 4438A) and 26 (K 5440B).

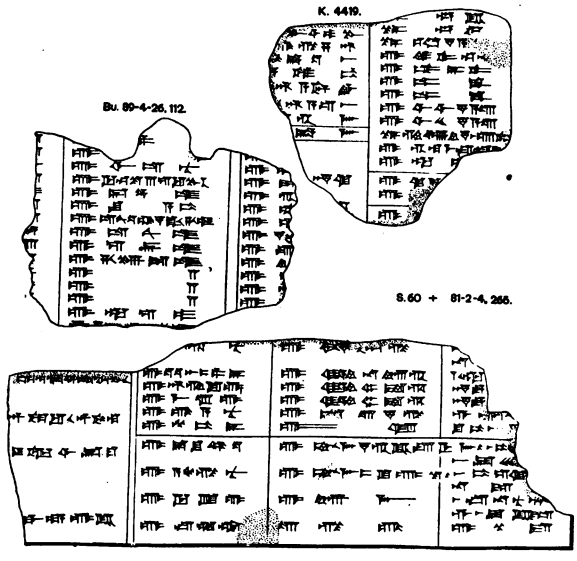

FIG. 11.

Lists of medical drugs. - ("Cuneiform Texts from Babylonian Tablets, &c., in the British Museum," part xiv, Pl. 43.)

The upper fragment to the right (K 4419) contains in the left column a list of stones used in medicine, and in the right column a list of plants and seeds. The sign for stone (Na = *abnu*) may be seen in the third line of the left-hand column and in the eighth line, which contained a summary of the number of stones enumerated. The sign for plant (*U* = *shammu*) introduces the substances named in the right-hand column, beginning with line 4.

The fragment to the left (Bu. 89, 4-26, 112) consisted probably of four columns. The columns partially preserved contain lists of substances introduced by the sign for plant. In the one column is given the phonetic spellings of plants, in some cases accompanied by explanatory additions. The ideographic forms must therefore have been furnished in the column to the left of which only the traces at the end of the lines appear, and which formed the first column. The other column contains the beginning of lines giving ideographic forms of plants, the phonetic spellings of which filled the missing fourth column.

The lower fragment (S. 60 + 81, 2-4, 265) contains to the extreme left the colophon of the tablet, indicating that the tablet belonged to the collection of Ashurbanapal, and recording in the second (visible) line the names of Ninib and Gula—the god of healing and his consort —at whose instance the king tells us that he made the collection of the medical division of his library. Ninib and Gula, it will be recalled (above, p. 147), are the deities invoked in the greetings at the head o letters from physicians.

The second column gives the names of medicinal plants, the third the disease for which the drug is to be used, and the fourth the manner of its use. Thus the plant or drug "brilliant *khaldappanu*" (perhaps "oleander"—above, p. 146) is to be used for sickness of the nostrils. The following lines read:—

Tigilu for *mitri* sickness (perhaps some part of the nose).

Shibrû for *mitri* sickness.

Gânu for inflammation of the throat.

Sap of tamarisk for inflammation of the throat.

The use of the sign for plant in the column specifying the disease is an incidental proof that the sign has acquired the generic force of "drug." *See* above, p. 153.

be employed, as liniments, or to be taken in wine, to be taken fasting, mixed with honey, oil and strong drink, or in water or in milk.[1] A series of remedies are given in one of these lists for bites of a dog or a snake, or the sting of a scorpion, or a blow of some kind (fig. 12). Some of the remedies thus indicated are to be applied to the bitten spot, several are to be made into an ointment and placed around the neck, or to be taken in wine, or wine mixed with oil. In one case it is specified that the oil is to be heated; in another that the leaves of a plant are to be applied to the face of the sick person. A compound frequently occurring both in medical and in ritual texts is known as *Ninib* salve—the god Ninib being, as you recall, the special god of healing—and we are told in a list of remedies that the salve is to be used in a disease of the joints, *bennu*, mixed with oil,[2] while another substance, unidentified as yet, is to be rubbed on the neck for the same trouble.[3]

We have a long list of drugs to be used in the case of eye diseases,[4] presumably as washes and ointments. Among these the root and seed of cynoglosson occurs,[5] beside the seed of various reeds, plants, and thorns, leaves of tamarisk, and the thick juice of a plant *il*. I believe that I can identify another drug as made of the marrow of beans, and a point of special interest is the specification of *kukru* (which, as already suggested, is our chicory), mentioned among the ingredients for cases of "double vision,"[6] as the literal rendering of the word would be, that is, a disturbed vision in which objects appear double—diplopia. Another list gives the names of a series of drugs to be used for diseases of the mouth, which include inflamed gums, swollen cheek, and ulcers.[7] Lists of this kind are usually arranged in three columns, the first column furnishing the name of the drug, the second that of the disease for which it is to be used, and the third how it is to be used. Thus, the drug "male pestilence root" is described as a drug for sickness of the mouth, to be placed on the mouth.[8] Of a thorn root to be

[1] E.g. "Cuneiform Texts," xiv, Pl. 23 (K 9283); 26 (K 9147); 27 (K 8827); 29 (K 4566, &c.); 31 (D.T. 136).

[2] "Cuneiform Texts," xiv, Pl. 23 (K 9283), line 17.

[3] *Ibid.*, line 18.

[4] *Ibid.*, Pl. 29 (K 4566, &c.).

[5] *Ibid.*, lines 8 and 15.

[6] Lines 31, 32.

[7] Pl. 23 (K. 259), *see* fig. 12.

[8] In the text referred to in the preceding note.

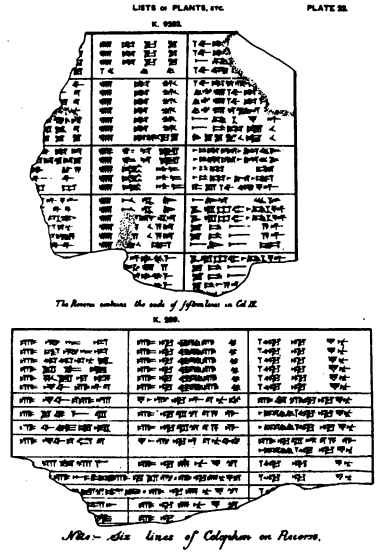

FIG. 12.

Three-column lists containing names of plants or drugs, the ailment for which they are to be used, and how they are to be taken or how applied. ("Cuneiform Texts," xiv, Pl. 23.)

The fragment of the upper plant specifies in the first division of the second column that the plants in the first column are to be used for "dog bites." In the second division were enumerated six drugs for "serpent bites," while in the seventh line of this division a drug was named good for both serpent bites and dog bites. In the third column of this second division are such specifications as that a certain medicinal substance is to be placed around the neck, another to be taken in wine.

In the fourth division the first line reads:—

Ninib-salve	for *bennu* sickness	to be mixed with oil

(For Ninib-salve see above, p. 156. Bennu is a disease of the muscles—probably a form of rheumatism.

The first division of the larger tablet furnishes six substances to be used as follows:—

Male pestilence root ...	A drug for sickness of the mouth	To be placed upon the mouth
Root of male pestilence root ...	,, ,, ,,	,, ,, ,,
Green kulkullanu ...	,, ,, ,,	,, ,, ,,
Turnip	,, ,, ,,	,, ,, ,,
Khalulaia	,, ,, ,,	,, ,, ,,
Root of sun plant ...	,, ,, ,,	,, ,, ,,

used for mouth troubles, it is said that it must not be plucked while the sun shines. In another line of the text where the same precaution is added, it is to be compounded with white *karuti* (perhaps an onion variety), mixed with oil and placed on the mouth. Several plants, including turnip seeds, are enumerated as remedies for a swollen cheek. It is quite likely that such fragments belong to a series in which in succession the drugs for all diseases were enumerated with indications for their use. To this series would then belong another tablet of which only a portion has been preserved, setting forth drugs for diseases of the anus, which are to be mixed with oil or fat, or with sweetened wine, and to be applied to the anus, though in one case it is specified that the leaves of the drug are to be taken in wine.[1] Other portions of this series would be represented by fragments dealing with diseases of the heart, of the head and throat,[2] with such interesting specifications as pain of the throat, cold of the throat, inflammation of the throat, swelling of the throat, heart spasms, enlargement of the heart, heartburn affecting the throat, and so forth. In the same way we find remedies for diseases of the nose,[3] for miscarriage, for sterility,[4] and if my interpretation of a passage in this list be correct, for abortion.[5]

Of curious interest as introducing us to the Babylonian and Assyrian "Dreckapotheke," are lists intended to indicate the nasty and ill-smelling substance with which a genuine medical remedy is to be compounded,[6] the remedy for the purpose of helping the patient, and the nasty drug in order to disgust the demon. In this way the chicory plant is to be mixed with a green frog, pestilence root with a claw of a black dog, a thorn plant with earth taken from the "outer gate," a green vegetable of some kind with the dust of a man's foot.[7] From such substances we pass to swine's fat, swine's tail, dog's dung, the neck of a dog, the foot of a small insect, the fat of a serpent, excrement

[1] Pl. 30 (Sm. 698); *see* fig. 13.

[2] Pl. 36 (81, 2-4, 267).

[3] Pl. 43 (Sm. 60, &c.), fig. 11.

[4] Pl. 36 (79, 7-8, 22, and Rm. 2, 412).

[5] Pl. 36 (79, 7-8, 22, line 4 = Rm. 2, 412, line 9), *shalputi*.

[6] Pl. 28 (K 4140A); 41 (Rm. 2, 497); 42; 44 (K 4152); also Pl. 10 (at least the obverse), which is erroneously designated in the British Museum publication as "Lists of Animals, &c." An incidental proof that these lists are to be interpreted in the manner here suggested is the specification "take" with, &c.—e.g., Pl. 10, obv. 10.

[7] These examples from K 4152 ("Cuneiform Texts," xiv, Pl. 44); *see* fig. 15.

of man, and urine,[1] the hair of a virgin goat,[2] human bone,[3] and so on through a long array.

The partial enumeration of the strange substances thus grouped together is sufficient to show that we are not dealing with such drugs

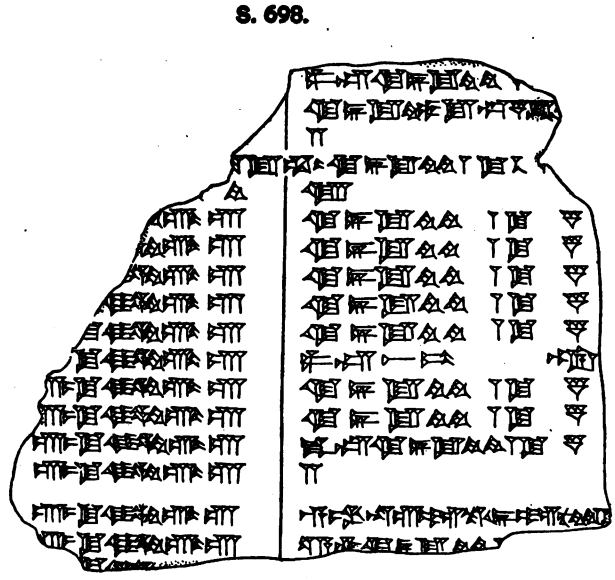

FIG. 13.

List of drugs for diseases of the anus. ("Cuneiform Texts," xiv, Pl. 30.)

The list consisted originally of three columns. The first column, which is entirely missing, contained the names of the plants, the second column indicates that all the drugs enumerated were to be used for "disease of the anus," while the third column specifies the manner of applying the drug—reading in part as follows:—

its twig (i.e, of the plant named), mixed with oil [to be placed on the anus].
mixed with oil and placed on the anus
(repeated in the following six lines).
its twig to be taken in wine.
mixed with oil to be placed on the anus.
Ditto ditto.
the green part (i.e., of the plant named) mixed with oil to be placed on the anus.
Ditto ditto.

as by experience were found to be directly beneficial. The point of view is of a more primitive order, and directed towards the demon as the cause of the disease. The substances constitute the "sick diet"

[1] These examples from K 4152 ("Cuneiform Texts," xiv, Pl. 44) and K 4163 (Pl. 42); *see* figs. 14 and 15.

[2] Pl. 28 (K 4140A), lines 6, 7.

[3] Pl. 28 (K 4140A), line 12.

for the demons, and you will agree that they are sufficiently unpleasant to serve such a purpose. On the surface it would appear that the substances enumerated are all of a kind calculated to disgust the demons, to drive them away by their nasty odours; but since there is no accounting for tastes, it is possible that some of the substances were such as were intended to please the demons, whose diet would naturally differ from that of human beings, and that they were offered as tidbits to placate them and to gently coax them out in the hope of getting "more." *De gustibus non est disputandum*, which in this case might be amended to *disgustibus*. Be this as it may, the medical aspect of such substances accounts for their being introduced likewise into ceremonies accompanying incantations as a means of exorcising the demons.[1]

The ingredients of the Babylonian-Assyrian "Dreckapotheke" are of the same order as the substances that go to compound the charm of the magic cauldron of the witches in "Macbeth."[2]

"Fillet of a fenny snake,
In the cauldron boil and bake:
Eye of newt and toe of frog,
Wool of bat, and tongue of dog,
Adder's fork, and blind-worm's sting,
Lizard's leg, and owlet's wing,
For a charm of powerful trouble,
Like a hell-broth boil and bubble.

"Double, double toil and trouble;
Fire, burn; and cauldron bubble.

"Scale of dragon, tooth of wolf,
Witches' mummy; maw, and gulf,
Of the ravin'd salt-sea shark;
Root of hemlock, digged i' the dark,
Liver of blaspheming Jew,
Gall of goat, and slips of yew,
Sliver'd in the moon's eclipse;
Nose of Turk, and Tartar's lips;
Finger of birth-strangled babe,
Ditch-deliver'd by a drab,
Make the gruel thick and slab:
Add thereto a tiger's chaudron,
For the ingredients of our cauldron.

"Double, double toil and trouble;
Fire, burn; and cauldron bubble.

"Cool it with a baboon's blood,
Then the charm is firm and good."

[1] Examples in "Cuneiform Texts," xxiii, Pl. 4, 6, = Pl. 8, 40, hair of male and virgin goats, tail of kid; 17, 35, hoof of ox; and in the incantation texts where, as pointed out, substances of this character are frequently introduced.

[2] Act IV, i, lines 14-38.

These substances are not chosen haphazardly. Many of them were still in use in Shakespeare's days as medicinal remedies[1]—as survivals from the period when the aim of the healer's art was to drive out the demon. Others, like "scale of dragon" and "tooth of wolf," may have been amulets, but an amulet has also a medical aspect; it falls within the category of preventive medicine, a kind of inoculation against the demons. Medicinal drugs, charms and incantations are thus merely

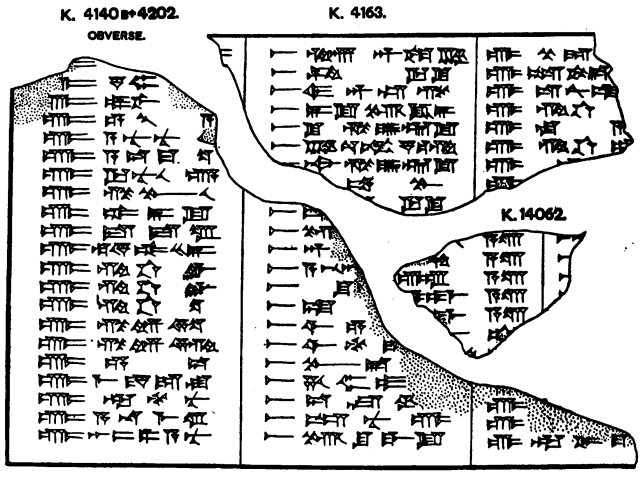

FIG. 14.

List of plants together with animal or human substances with which they are to be combined. ("Cuneiform Texts," xiv, Pl. 42.)

The first column gives the names of the plants, the second the animal or human substances. Thus the last line states that

Khaldappanu is to be used with a viper (mushshugallu).

Among the animal substances named are :—

(1) Tail of a swine; (2) dog's neck; (3) foot of anzuzi (an insect), fat of a viper (mushkenu); (4) human anus—i.e., excrements of a human being; (5) human penis—i.e., urine.

different phases of the same point of view, and there is, as a matter of fact, an unbroken chain connecting the use of such substances as a means of compounding a powerful charm, which in this instance gives the

[1] *See* Dr. Furness's interesting note on the mummy as a drug in the *Variorum Edition* of *Macbeth* (2nd ed.), p. 248 *et seq.* Mummy was used for gout, for epilepsy, and as a styptic. That the mummy was generally manufactured out of a dead carcase did not seem to interfere with the effectiveness of the drug. Dr. Furness quotes from Sir Thomas Browne's "Urn Burial," p. 28 (ed. 1658): "The Egyptian mummies which Cambyses or time hath spared, avarice now consumeth. Mummies is become merchandise, Mizraim cures wounds and Pharaoh is sold for balsams."

witches the power to conjure up the future, with the "Dreckapotheke" of ancient Babylon. The latter as a phase of primitive medicine presents the double aspect of a means of ridding oneself of the clutches of a demon and of a series of ingredients for compounding a powerful charm in which formulæ and strange or disagreeable substances play an equal part—being capable of either casting a spell or of breaking it, according to circumstances. The incantation or charm is thus essentially a medical prescription, in which, however, the words of the medical formula are as significant as the prescription itself. The two in combination work the charm, and we have as a further instance of the persistence of early points of view the attitude towards medicine surviving in various parts of the modern East, where it is not uncommon for patients to swallow the medical prescription as well as the medicine prescribed. The physician's mysterious symbols are an incantation, and the medical compound is regarded merely as an accessory, though perhaps, a necessary one.

Lastly, before leaving the subject, let me call your attention to specimens of actual prescriptions[1] as further aids to the study of medicine. These specimens form, no doubt, part of an extensive dispensatory that may have covered a large number of tablets and which gave in some systematic sequence the prescriptions for the various diseases that were more fully treated in the medical handbooks. The form of the prescription is very simple, an enumeration of the drugs with the indication of the disease. Thus we have a prescription of eight distinct drugs for heart disease; another of five drugs to be compounded for *akkhhazu*,[2] and again six drugs for jaundice. In comparing the substances mentioned for the two latter diseases, it is of importance to note that they actually occur among the compounds mentioned in the medical texts.

It will have become apparent to you by this time that the chief problem besetting us at present in the study of Babylonian and Assyrian medicine is the determination of the hundreds of drugs that are found in the lists, and in the medical texts proper. The task is indeed a formidable one, because the names are generally written as ideographs, that is, with one or two signs representing the word. The ideographs them-

[1] "Cuneiform Texts," xiv, Pl. 48 (Rm. 328); *see* fig. 16.

[2] Such prescriptions must be differentiated from texts which merely enumerate the diseases for which certain drugs are to be used, as K 14047 and Rm. 357 ("Cuneiform Texts," xiv, Pl. 26 and 37), where in the first column the drug is mentioned, and in the second the ailment for which it is to be used. Thus five certain substances are entered in Rm. 357 as remedies for bowel complaints (*Ṭu*), for jaundice (*amurriḳanu*), &c.

selves are often fanciful, as "dog's tongue," "fox-wine," "life-plant," "pestilence," and the like. It is only when the names are written, in the lists or in the texts phonetically, that is to say, spelt out by syllables, that we have a definite point of departure. At times the names reveal the character of the plant, but in most cases it is only if we can find a corresponding term in one of the languages cognate to Babylonian, such as Hebrew, Arabic, Syriac, and Aramaic that we can solve the problem involved. Now, fortunately, we have long lists of

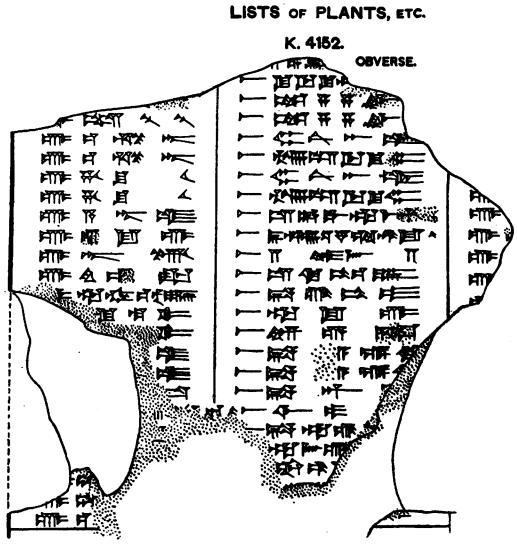

FIG. 15.

Another list of plants with animal, human, mineral, and other substances with which they are to be combined. ("Cuneiform Texts," xiv, Pl. 44.)

The left-hand column contains the name of the plants, the right-hand column the substances with which they are to be combined, e.g.:—

Kukru (i.e., chicory) with a green frog.
Pestilence root with the ankle bone (?) of an ass.
,, ,, with the claw of a black dog.
Khashû plant with the ankle-bone (?) of an ass.
,, ,, with the claw of a black dog.
Atartum plant with earth from the outer gate.
Lillû with fat of a white pig.
Tarmush (bean ?) with fat of a white pig and rancid (?) fat.
Khi . . . herb, with dust trodden by a man.
Kamun (cummin) of tamarisk with gabî stone.

In the following lines several more stones are mentioned. The use of the sign for plant before a substance described as a part of the tamarisk tree again illustrates the extension of the sign for "plant" in the literal sense, to trees (which are usually introduced by the sign of "wood"), and no doubt to organic substances in eneral. Hence we find in these lists the same substance, sometimes introduced by the sign for plant, or by the sign for wood, or by both.

medicinal herbs, plants, woods and roots in the medical literature of the Arabs.[1] Similarly, the Bible furnishes us with the native names for the most common trees and plants. Supplementary to the Bible we have the great compilation of the rabbis of Babylonia and Palestine known as the Talmud, and which reveals, incidental to discussions on questions of ritual, an extensive herbarium in Aramaic,[2] as well as other medicinal substances. Thirdly, we have medical compilations in Syriac literature, of which a most important and unusually comprehensive specimen has just been published by Mr. Budge, of the British Museum.[3] Though Syriac as well as Arabic medicine, and in part the medicine of the Talmud, are based on Greek models, and to a large extent form merely an adaptation of the great medical treatises of Hippocrates and Galen and their followers; still a considerable amount of the earlier native medicine survived both among the Arabs and the Syrians as well as among the Jews of the Talmudic age. This applies particularly to the names of plants, herbs, woods and roots, which would naturally be preserved in many cases in their native forms, though, on the other hand, many of the terms are of Greek origin. However, all that glitters is not gold, and not every drug that has been accepted as of Greek origin is really Greek. There are quite a number of instances of supposed Greek pharmacological terms which can be shown to be of Babylonian origin, and I venture to predict that further studies will strengthen the position that traces of the medicinal nomenclature of the Babylonian and Assyrian schools of medicine will be found in Greek medicine, which despite its advanced scientific form also carried over a portion of the legacy of an earlier age.

We may also expect to get some help from the important medical compilations of the ancient Egyptians.

Without desiring at this point to enter upon vexed questions as to the relationship of Babylonian to Egyptian medicine, we are, I think,

[1] *See*, on the extensive medical literature of the Arabs, Brockelmann, "Geschichte des Arabischen Literatur," i, pp. 230-240, 482-494, and Leclerc, "Histoire de la Médecine Arabe," 2 vols., Par., 1876.

[2] Utilized by Löw in his great work on "Aramäische Pflanzennamen," Leipz., 1881; a mine of most valuable information from the medicine of the ancient and modern East. The medicine of the Talmud is admirably treated by Ebstein in his work "Die Medizin im Neuen Testament und im Talmud," Stuttg., 1903; Preuss, "Biblisch-Talmudische Medizin," Berl., 1911; see also "Die Medizin der Juden" in Neuberger and Pagel, "Handbuch der Geschichte der Medizin," i, pp. 110-118, now supplemented by Kraus, "Talmudische Archæologie," i, pp. 252-266.

[3] "The Syriac Book of Medicines" (fuller title "Syriac Anatomy, Pathology, and Therapeutics; or the Book of Medicines"), 2 vols., Syriac text. English translation and elaborate introduction and indices; Oxford University Press, 1913.

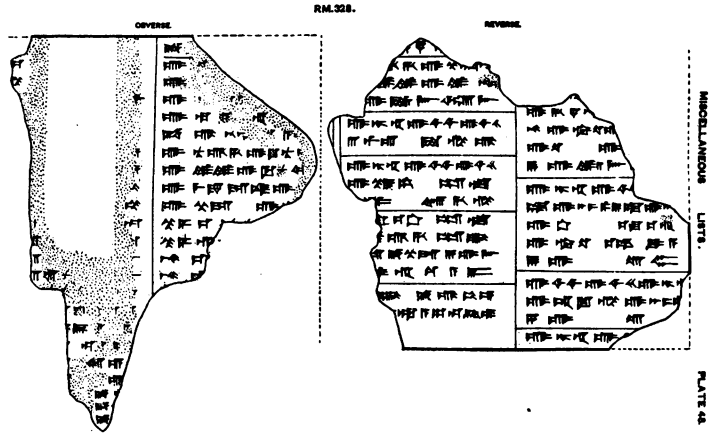

FIG. 16.

Specimens of medical prescriptions. ("Cuneiform Texts," xiv, Pl. 48.)

The obverse contains list of medicinal plants and stones, roots and seeds; the reverse a series of prescriptions, each placed in one of the divisions within the lines drawn across the tablet.

The first division of three lines to the left contains three drugs—Tarkhu, Shilim (darnel), Shiman—for an injury to the hands.

The second division of three lines contains five drugs to be compounded for *akhkhazu*, an advanced form of jaundice (above, p. 145). The drugs are again Tarkhu, Shilim, and Shiman with Karshum (leek ?) and Burashu (cypress).

The fourth division contains six drugs, including cypress, nulakhkha herb and mountain stone for *amurrikanu*—i.e., jaundice.

The first division to the right contains nine drugs for a disease that cannot be determined owing to the defect of the tablet at this point.

The second division reads :—

> "Tarkhu, shi-[lim shiman].
> root of khaldappanu, root of tarmush ("bean" ?).
> supalu, fig . . . [another tree-fruit].
> White Ak, fox-wine.
> Nine drugs for heart disease."

The third division contains five drugs, also for some heart trouble, namely:—

> Shilim (darnel) shiman, Tar [khu]
> Alluzi, Khaldap[panu]
> Five drugs for the heart . . . .

(The specification of the kind of heart trouble is broken off.) Note the use of the sign for "plant" in the summary of the substances named—another indication that the sign is used in the very general sense of drug. We thus have, in the medical texts, three distinct usages of this sign: (1) plant in the narrower sense; (2) organic substances; and (3) drug in general —whether organic or inorganic.

quite safe in assuming that beneath the still unidentified hundreds of drugs in Babylonian and Assyrian medical texts and sign lists there lie concealed to a very large extent the same substances that have been fortunately identified in Egyptian texts.[1] We should therefore expect to find substances like aloes, acanthus, crocus, mastic, nasturtium, saffron, mandragora, pomegranate, and probably also absinthe and opium. Lastly, as a subsidiary source, the books in Pliny's Natural History devoted to plants and herbs and to medicine in general[2] are to be added, and which form a marvellous summary of the popular and scientific knowledge of the day, and incidentally embody notices of great value for Babylonian-Assyrian medicine. Through these various aids, Assyriologists devoting themselves to this special field of research will succeed in adding considerably to the number of identifications of the hundreds of drugs occurring in texts and lists. For some time I have been engaged in this work, and I trust ere long to publish the results of my studies in a technical journal. No doubt other scholars will in the immediate future also devote themselves to this task.[3] The interest of Assyriologists is now largely centred on the study of the Omen literature of Babylonia and Assyria, and this means that increased attention will be given within the next few years also to the medical literature as an offshoot of divination in combination with incantation practices.

VI.

Medical treatment among the Babylonians and Assyrians consisted, as we have seen, largely in the administering of drugs of a varying number of ingredients and tested substances of therapeutic value. Drugs, drugs everywhere, given in wine, or water, or milk, or oil, or in several of these substances. If this were all, our estimate of the medicine of Babylonia and Assyria would have to be summed up in the verdict that it had not passed beyond the range of treatment of disease, purely on the basis of popular experience of the medicinal value of

[1] The three chief compilations of Egyptian medicine are: (1) the famous Papyrus Ebers, of which a new edition is being published by Wreszinski, "Der Papyrus Ebers," Leipz., 1913; a German translation by Dr. H. Joachim appeared in 1890; (2) the London papyrus (ed. Wreszinski; "Der Londoner Medizinischer Papyrus," Leipz., 1912); (3) "The Hearst Medical Papyrus," published by Dr. George Reissner (University of California Publications, 1905); and (4) the Berlin papyrus, published in 1909 by Wreszinski, "Der Grosse Medizinische Papyrus des Berliner Museums."

[2] Medicine in Books xxviii-xxx; botany scattered throughout Books xx-xxvii.

[3] Holma's investigations of Assyrian plant-names in his "Kleine Beiträge zum Assyrischen Lexikon," pp. 57-94, show the method to be pursued in this sphere of research.

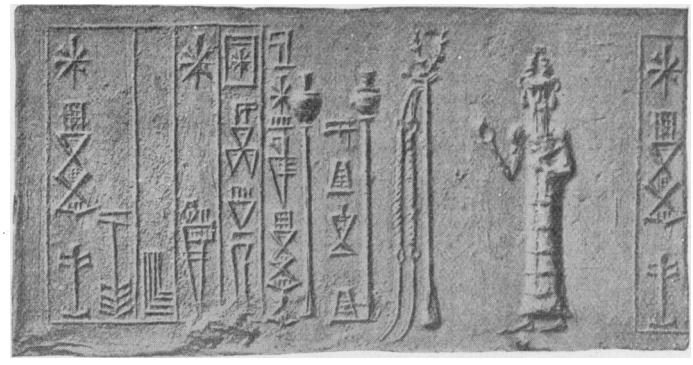

FIG. 17.

A seal of a Babylonian physician; reproduced from De Sarzec, "Découvertes en Chaldée," Pl. 30 bis.

The seal cylinder was used in Babylonia and Assyria by all classes as a personal signature, attached to legal and business documents, which, it will be recalled, were written on clay. Herodotus, Book I, § 195, refers to this custom, and, in confirmation of the general use of seal cylinders, many thousands have been found dating from all ages of Babylonian-Assyrian history down through the period of Persian supremacy. These specimens, scattered throughout the museums of Europe and this country, and in private collections, often, though by no means always, contain the name of the owner, to which frequently a dedication to some deity or the indication of the status of the owner, or both, are added. The main feature of the cylinder, however, is the design, which is almost universally of a religious or semi-religious character—pictures of deities with worshippers being led into their presence, scenes from myths or from the Gilgamesh Epic, or based on mythological traditions, or symbols of the cult. A detailed and most careful study of the almost endless variety of designs has been made by Dr. W. Hayes Ward, "The Seal Cylinders of Western Asia," (Washington, Carnegie Institution, 1910). The material of which these cylinders—in the older period thick and oblong, in the latter periods tending to a cone shape—were made is as varied as are the designs: shell, serpentine, marble, aragonite, lapis-lazuli, chalcedony, jasper, crystal, carnelian, obsidian, &c.

The material of the physician's seal here reproduced is a light-grey limestone; it is unusually large, 60 mm. high and 30 mm. in diameter. The inscription furnishes the name of the owner, Ur-Lugal-Edina—i.e., "the man (or devotee) of the god Lugal-Edina," and there is added to the name the word *a-su*—i.e., physician. Our physician dedicates the cylinder or himself to the god Edina-Mugi, whom he designates as the messenger of the god, Gir, which is a name or a form of the god of pestilence and death. The third line of the inscription contains some epithet of Gir which is not clear. Omitting this, the dedication reads:—

"(to) Edina-mugi
the messenger of Gir
. . . . .
Ur-Lugal-Edina
the physician, his servant."

Von Oefele sees in the two objects on the slender poles, cupping instruments, and Zehnpfund ("Beiträge zur Assyriologie," iv, pp. 220-26), following this suggestion, tries to find the word for "cupping instrument" in the accompanying inscription. All this is pure speculation, and Zehnpfund's reading of the inscription is quite impossible. As Ward properly suggests ("Seal Cylinders of Western Asia," p. 265), the two vases have the ordinary shape of such objects which are very frequent on seal cylinders. They may very well, however, represent part of the physician's outfit. Jars and cups of various kinds are frequently referred to in the medical texts, and we have long lists of all kinds of such utensils (e.g., V. Rawlinson, Pl. 44). The physicians would naturally need jars in which to keep and mix their drugs. Similarly the objects to the right of the second vase I take to be the physician's instruments. Two of them have all the appearance of knives; the third might be a mortar or a scalpel to crush and pound the stones, plants, and seeds used as drugs, or to spread the ointments and salves on cloth or leather.

Is there, perhaps, an unconscious touch of grim humour in the physician's choosing a deity who is the messenger of the god of pestilence and death as his patron?

certain plants, herbs, roots, juices, oils, salts, alkalis, and woods. We have, however, more than sufficient evidence in the medical texts that the "healers" of Babylonia, as well as their Assyrian colleagues, had advanced to the recognition of other forms of treatment. Let me in conclusion set before you some methods revealed in these medical texts. You may recall that[1] in extracts from texts dealing with stomach troubles, we encountered such directions as to place the patient on his knees so as to relieve the tension of the muscles of the stomach; or to place the head low and the feet high, so as to bring about a more even circulation of the blood. Such methods betray more than popular observation or popular experience, and rest upon some study of the reasons for the phenomena manifested in disease. To the same level belong the many references to the enema as a means of relieving the patient, and which has up to the present generally been supposed to be the discovery of the Egyptian physicians. We find the enema given both in a warm and in a cold form, and the frequency of such ingredidients as oil and honey clearly shows the aim of soothing the inflamed and irritated muscles, as well as the swollen fleshy portions. That the same mixture is ordered to be taken through the mouth and to be introduced into the anus[2] may strike us as perhaps naïve, but the logic of the treatment is irreproachable. The aim of the enema was to reach portions that could not be attacked through the mouth. If the remedy was a good one, it ought to work equally well, no matter in what way it was brought into the body. On the other hand, I am inclined to believe that the frequent injunction to sprinkle the patient with a mixture given as an enema is a reversal to primitive methods, with a view of exerting an influence on the demon rather than on the patient. In other words, the sprinkling is a ceremony of the same order as the sprinkling of the blood on the altar, or on the individual as prescribed in some of the codes in the Old Testament.[3]

Of a different character is the direction to rub the stomach with the mixture or to pour it on the anus, or both. A case of this kind is set forth in the following language[4]:—

> "If a man eats and drinks to his fill and then his stomach cuts him (i.e., he has cramps), and his insides are affected and swell up and has colic, he is suffering from *mushekinu*. To cure him take cedar bark,

[1] *See* above, p. 131.

[2] E.g., K 191, &c., i, 30 (Küchler, "Beiträge, &c.," pp. 4-5).

[3] *See* above, p. 142.

[4] K 191, &c., ii, 17-20 (Küchler, "Beiträge," pp. 6-7).

juniper bark, sweet reed (something like sugar-cane), *balluku*-herb, myrtle, *khaldappanu* (oleander), chop up these six substances,[1] add wine, heat the mixture, pour it off, add honey and refined oil; let it cool, rub it on his stomach and pour it on his anus."

Nothing could be clearer, and whatever the modern verdict might be with regard to the efficacy of such treatment, it will be admitted that the preparation and use of this liniment—for such it was—rests upon a rational basis. The ingredients, especially the oil and the honey, were expected to act as emollients to relieve the contracted muscles and to reduce the inflammation.

I have not been able to find any definite reference to the enema as a means of bringing about an opening of the bowels, though experience must have shown this to be one of the results. It was applied, so far as the texts go, for its soothing and healing effect, indicated by the general use of oil, which is so common as to warrant us in designating the oil treatment as one of the favourite remedies in Babylonian and Assyrian medicine for all stomach troubles. To give another example for the case of cramps and diarrhœa, the following remedy is prescribed[2]:—

"If a man has cramps, his stomach does not retain food and drink, he brings it back through the mouth and he has vomiting spells, to cure him mix one half of a measure of dates (one half of a measure) of cassia, and add mint, and let him drink it fasting. Also prepare an enema of oil and introduce it into the anus, then his stomach will again retain food and drink, and he will recover."[3]

I have already had occasion to refer to the use of massage as an aid towards relieving pain in the stomach, and in passing we may note the frequent reference to the use of salts and of alkalis and of various other drugs, both as an aid in furnishing the digestive juices and to bring about an opening of the bowels. A typical instance is put briefly[4]:—

"When a man's liver is affected mix cassia in water, let him drink it and he will have a passage."

Varying directions to effect the same end are added, such as[5]: (1) A large quantity of sweetened wine; (2) herbs in water; (3) salt to be taken either in water or wine; (4) chopped onions taken in water;

[1] Text, "five," which seems to be a slip for six.

[2] K 71B, &c., iv, 43-44 (Küchler, "Beiträge, pp. 38-39).

[3] Indicated by repetition sign.

[4] K 61, &c., ii, 70 (Küchler, "Beiträge," p. 54).

[5] *Ibid.*, lines 71-73.

(5) *nukhurtu* plant and onions mixed together and taken in wine. Poultices, hot and cold applications, ointments and salves to be applied to various parts of the body are a further proof that the physicians of Babylonia and Assyria passed beyond the stage when medical treatment was limited to taking drugs inwardly, and that they must have developed at least some theory as to the reason for the relief to be expected through drugs externally applied.

There are many instances of directions to mix drugs into a paste, or a salve to be smeared on a cloth or on a bit of leather, and to be applied to some part of the body. A typical prescription for a head compress reads[1]:—

> "If a man has a burning headache affecting his eyes, which are blood-shot, take one-third of a measure of *sikhlu*, crushed and powdered, and knead with cassia juice, wrap it around his head, attach it (with a bandage), and do not remove for three days."

A more elaborate poultice for headache consists of the juice of seven plants mixed with wine, kneaded with cornflour into a paste to be spread on leather, wrapped around the head, attached, and to be kept there for several days. The directions are specific that the poultices are to be placed around the head and to be fastened with a bandage.[2] An interesting variation of the direct application is the direction to take certain kinds of clay, alkali, bone dust, rancid oil and fish oil, to mix together in a fire of thorns and to fumigate the head.[3] In the case of stomach troubles it would appear that the poultice was directly placed on the affected portion, though sometimes it was also spread on a cloth and firmly attached to a part of the body. A typical example reads as follows[4]:—

> "If a man's insides are affected take a half measure of barley flour (?), half a measure of crushed sesame, half a measure of *kibtu* flour, half a measure of chicory, half a measure of cypress plant: mix together with juice of cassia, knead it into a paste and apply."

Simpler poultices consist of half a measure of *sikhlu* and turnip seed kneaded with milk, spread on a cloth and applied to the stomach,[5] or of a measure each of two kinds of flour kneaded with wine, spread on

[1] "Cuneiform Texts," xxiii, Pl. 27, 12-13.

[2] A large variety of poultices are given in "Cuneiform Texts," xxiii, Pl. 26-33.

[3] "Cuneiform Texts," xiii, Pl. 26, 10-11.

[4] KK 71B, i, 11 (Küchler, "Beiträge," p. 14).

[5] *Ibid.*, line 20.

a cloth and attached.[1] We may form some idea of the extent of the medical experience of the past gathered together in these texts, by noting that over a dozen different kinds of poultices are enumerated in connexion with pains and cramps in the stomach. In several instances directions are added to keep on with the poultices day and night,[2] which, of course, implies changing them from time to time. In the case of poisoning through a scorpion's bite a salve is prescribed composed of nine drugs, including two kinds of stones as ingredients (to be powdered, no doubt), the whole to be mixed together with cedar oil and then to be applied locally. As an alternative, a simpler salve, consisting of Shilim (darnel) mixed with oil is prescribed.[3]

Lastly, and as a third indication of the more scientific aspects of Babylonian and Assyrian medicine, let me give you a few illustrations of the diet prescribed for the sick in cases of indigestion, in which the stomach refuses to retain food. The patient is to abstain from onions and leeks.[4] This precaution is frequently prescribed and is generally combined with the direction to wash in pure water or with the juices of various plants and herbs. Physicians did not, however, always agree, and so we come across a case of vomiting spells in which just the contrary is recommended, that for three days the patient should not wash (and abstain from onions and leeks), and, it is added, he will recover.[5]

A diet for stomach trouble in one instance appears to have consisted of two substances, one of which unfortunately cannot be determined owing to the defective condition of the tablet at this point, and the other is literally translated "the sediment of butter"[6] (can butter-milk be meant?). Another diet prescribed for stomach troubles consists of

[1] Line 16.

[2] KK 71B, &c., iv, 13, 19, 24, 26, and 29 (Küchler, "Beiträge," pp. 34-36).

[3] K 7845, obv. 4-13 (published by Fossey in *Zeitschr. f. Assyriologie*, xix, pp. 175-181, with further explanations by Frank in vol. xx, pp. 431-437. Attached to the prescriptions is a magic rite consisting of stringing nine stones on a cord of white wool and hanging them around the patient's neck. The remainder of the text deals with similar prescriptions against poison. In one case four drugs with which the patient is to be fumigated; in another, when the whole system is poisoned, no fewer than sixteen substances are enumerated, including twigs and seeds of tamarisk, seed of liquorice root, several thorny plants and weeds, the whole to be heated in fire—apparently with a view of burning out the wound.

[4] KK 71B, &c., iii, 17 (Küchler, "Beiträge," p. 28); also KK 191, &c., ii, 30 (Küchler, p. 6); also *ga-bi*, another variety of onion.

[5] *Ibid.*, ii, 38 (Küchler, "Beiträge," p. 24).

KK 191, &c., ii, 8 (Küchler, "Beiträge," p. 4).

dates to be eaten in pig's fat, or in oil,[1] for swollen stomach with inclination to vomiting spells, onions with black cummin.[2] Again, in illustration of varying opinions among the physicians, we find a diet of green onions and chicory leaf to be beaten up in wine.[3] In quite a number of cases quiet and rest is prescribed, the terms reading: "Let him rest quietly," or again, "Let him lie down and keep quiet";[4] and you will have noticed the frequency with which it is specified that medicinal potions are to be taken "without food," that is, on an empty stomach, evidently with a view of giving the medicine a chance to have its full effect.

Here I must rest my case, and I feel that I have kept you, as it is, beyond normal endurance. I should have liked very much to have touched upon the important question of the influence exercised by Babylonian and Assyrian medicine upon the ancient world. Briefly, let me say that the more direct traces of this influence are to be seen in the medicine of the Jews as revealed in the many passages of the Talmud in which medical treatment is discussed.[5] The Jews of Babylonia and Palestine naturally came under the direct influence of Babylonian and Assyrian civilization during the centuries (second B.C. to about the sixth A.D.) represented by the medicine in the Talmudic compilation, just as we find such striking proofs of this influence in the pages of the Old Testament covering the earlier periods—in the popular traditions, in the customs, in the laws and the literature of the ancient Hebrews. Despite the introduction of the more scientific methods of Greek medicine, the Jews clung to the Babylonian and Assyrian conception of disease as due to demoniac possession. We find incantations and magic rites in the Talmud[6] of precisely the same character as in the Babylonian and Assyrian literature, including even traces of a *Dreckapotheke*.[7] Such specific parallels as the frequent directions to take medicinal potions in wine[8] can hardly be mere coincidence. Indeed, I have no hesitation in saying that the medicine of the Talmud

[1] *Ibid.*, line 11.

[2] KK 71B, &c., ii, 17, 18 (Küchler, "Beiträge," p. 22).

[3] KK 191, &c., ii, 10 (Küchler, "Beiträge," p. 6).

[4] KK 71B, &c., iv, 33 (Küchler, "Beiträge," p. 38).

[5] *See* Ebstein, "Die Medizin im Neuen Testament und im Talmud," and the other works above referred to, p. 164, note 2.

[6] *See* examples in Ebstein, *ibid.*, p. 170-180, and Blau, "Das Altjüdische Zauberwesen," Strassb., 1898.

[7] E.g., Ebstein, p. 178.

[8] E.g., Ebstein, p. 208.

reflects at almost every turn Babylonian and Assyrian influences.[1] I do not feel competent as yet to pronounce a verdict on the relation between the Arabic and Babylonian-Assyrian medicine, not having reached this point in my studies, but it would be surprising if we should not encounter some traces at least of the methods and practices that were developed in the Euphrates valley, though of course the dominant factor in Arabic medicine is Greek science. The same is the case in Syriac medical compilations, which are largely based on Arabic models and follow the methods of Greek physicians. The recent publications by Mr. Budge of a most elaborate medical treatise of Syria to which I have already referred[2] places students in a particularly favourable position for studying the relationship of Syriac methods to Babylonian and Assyrian medicine. Let me at least point out that attached to the main Syriac treatise which proceeds methodically to treat one disease after the other and to discuss the symptoms after the manner of Greek medicine, the compiler has added a long section on astrology,[3] in which, as in Babylonian and Assyrian omen collections, are included prognostications as to the outcome and duration of the disease according to the day of the month on which an individual is taken sick, with a large variety of omens from the position of planets, from the winds, from the moon and shooting stars, from eclipses, lists of lucky and unlucky days, &c. It is hard to resist the conclusion that we have here a distinct trace of Babylonian and Assyrian divination practices, just as we may recognize the direct influence of Babylonian and Assyrian medicine in another large section added by the compiler, in which he has put together a most formidable array of remedies for all kinds of diseases and which he designates as "native prescriptions."[4] These remedies,

[1] My friend Mr. Israel Abrahams, of Cambridge, has called my attention to the account given by Josephus ("Antiquities," Book VIII, 2, 5) of the exorcising of demons in his day by a certain Eleazer, who drew the demons out of the bodies of the victims by means of certain roots attached to a ring placed in the nostrils of the victim. The basin of water which the demon, in passing out of the body of his victim, is supposed to overturn, is clearly some magic rite performed in connexion with the exorcism. Josephus refers also to the tradition that, among the powers possessed by Solomon, was that of effecting cures through forcing demons out of the body. In Josephus ("Wars," vii, 6, 3) there will be found an account of the root *baaras*, which has the power, if brought to sick persons, of driving away the demons supposed to be the cause of the ailment. The method there described of plucking out the root by tying the tail of a dog to it appears again to be part of a magic rite in connexion with the use of the drug. Such notices show the persistency of methods of curing diseases which form a perfect parallel to those of Babylonian-Assyrian medicine and unmistakably betray the influence of the latter.

[2] Above, p. 164, note 3.

[3] Budge, "The Syriac Book of Medicines," i, pp. 441-553 (translation ii, pp. 520-655).

[4] Budge, i, pp. 553-601 = ii, pp. 656-714.

enumerated as supplementary to those embodied in the main part of the work, are clearly survivals of the earlier stage of medicine prior to the introduction of Greek methods. We find, as a matter of fact, mixtures among these native prescriptions, as well as in the main body of the work, that remind us of those in the medical texts of Babylonia and Assyria. We come across the frequent direction to take the medicine in wine (though beer, as in Egyptian compilations on medicine, is also included). We find a considerable number of ingredients forming part of a *Dreckapotheke* which points to the survival of the endeavour to cure the patient by disgusting the demon, and we also have directions of a distinctly magic character. As a general point of resemblance between Syrian medicine and that of Babylonia and Assyria justifying us in seeking for further influences of the latter, I may instance the use of the Syriac word for heart, *lebba*, precisely as the Babylonian *libbu* in the medical texts for the "belly."[1]

The situation is quite different in the case of Egyptian medicine, which appears at an early period to have succeeded in cutting itself entirely loose from the bonds of incantations and magic rites. The Papyrus Ebers, dating from the sixteenth century B.C., and other medical papyri of about the same period are markedly free of all primitive notions. These compilations merit the name of being systematic treatises of medicine, passing from one disease to the other, according to a logical order. These hand-books set forth the symptoms and give the remedies, which reflect a far higher order of exact and scientific knowledge than is to be found in the medical texts of Babylonia and Assyria. And yet when we turn to the remedies and find such substances as dung, uterus and vulva of various animals included in the therapeutics, the conclusion is forced upon us that in Egyptian medicine also, the purpose of medical treatment, namely, the driving out of the demon as the cause of the disease, was not lost sight of. Such parallels, however, as may be observed between the methods of Egyptians and Babylonians respectively are not of such a nature as to justify us in assuming a borrowing on the one side or the other. It is quite natural to find milk, honey, oils, salts, cummin, cedar, cypress, and the roots and juices of leaves of other plants used in the Egyptian papyri, as in the medical texts of Babylonia and Assyria. If any connexion exists in the earlier periods we must assume the influence to be that of Egypt as the higher form upon Babylonia. In the later period of Egyptian history, however, the situation changes. Egyptologists seem to be united in asserting that in the time of the new kingdom and sub-

[1] *Ibid.*, chap. xv, i, p. 267 = ii, p. 305.

sequent to this age magic and incantations reappear as factors in the treatment of diseases.

If this is correct, then I have no hesitation in ascribing this recrudescence of primitive belief and practice to the spread of Babylonian-Assyrian divination throughout the ancient world, to which attention was directed in an earlier portion of this investigation.[1] Medical treatment in Babylonia and Assyria was so closely associated with divination as well as with incantation and magic rites that the spread of the latter would involve the influence exerted also by medical treatment beyond the confines of the Euphrates and Tigris.

Lastly, to say just a word on Greek medicine, it is clear that Babylonia had nothing to teach Greece which could have led to the great schools of medicine associated with Cos and Cnidos. It is probable that with the spread of Babylonian hepatoscopy, astrology and birth-omens into Greece (as into Egypt), some of the medicine of Babylonia and Assyria also travelled westward, but the influence could not have been pronounced. On the other hand, we have the testimony to Egyptian influence in Homer, who refers to Egyptian physicians. The occurrence of Egyptian herbs, of certain organic and inorganic substances in Greek medicine, likewise point to Egypt. With Hippocrates (c. 460-375), however, an entirely new era set in. The scientific spirit of Greece that had early manifested itself in the philosophical systems, in mathematics and astronomy, seizes hold of medicine and converts what had hitherto been a purely empirical study to a scientific one, based on principles that maintained their hold to the rise of the new medicine in our own days. In the popular remedies of the Middle Ages, on the other hand, which mark the return of methods the very reverse of scientific, and which survive as extra-medicinal elements of our own civilization, relegated to the root and herb doctors and to quacks of all kinds, we may see the continued influence of those ideas and practices which prevented Babylonian-Assyrian medicine from rising superior to its surroundings. But for this inherent weakness of Babylonian-Assyrian medicine we might have had in Mesopotamia a development that would have insured to the medicine of that country a worthy place by the side of that of Egypt, and which might have become the connecting link leading to the remarkable achievements of the Greeks. As it is, the credit for having exerted a direct stimulus on the Greek mind in this field belongs to the medicine as revealed in the Egyptian papyri.

[1] *See* above, p. 126.

And now it only remains for me to thank you for the patience with which you have followed this endeavour to sketch in outline the course taken by Babylonian and Assyrian medicine, and to set forth some of its salient features. While we should be careful not to exaggerate the achievements of ancient civilizations, it is, notwithstanding, surprising to find that the Babylonian and Assyrian "healers" advanced as far as they did in the recognition of so large a number of specific diseases, in supplying these diseases with names, and in defining in many cases varieties of the same disease. Considering that, as I have tried to emphasize with special force, medicine remained attached down to the latest days of Babylonian and Assyrian history to the demon theory of disease, that incantation rites continued to be regarded an an important accessory to medical treatment, and that divination practices further held in check the free development of medical science, it is, I think, a rather notable achievement that the physicians of Babylonia and Assyria should have passed across the barren wastes of incantation rites and divination practices, and reached at least to the border of the promised land of pure genuine medical science. Indeed we may, perhaps, go a step further and assert, on the basis of the medical texts, and of the various aids to the study of Babylonian-Assyrian medicine, on the basis of the numerous prescriptions for poultices, for dressings, for massage, diet and rest, that Babylonian and Assyrian medicine, through some of its anonymous representatives, passed beyond the frontier and took possession of the outposts. The further steps in the invasion of the territory of true medical science were, however, left to others—to the Egyptians of an early age, whose medicine once stood on a far higher plane than that ever attained by Babylonian and Assyrians, and more particularly, of course, to the great Greek physicians of the fifth and fourth centuries before this era.

Let us, at all events, be grateful to the great King Ashurbanapal, who had the happy idea of preserving the legacy of past ages in his palace at Nineveh, and no less to the explorers who, amidst great difficulty, succeeded in rescuing so large a portion of this treasure; and lastly, to the scholars of England, of France, of Germany, of my own country and of other lands, through whose combined efforts we have been enabled to add a chapter to the history of human endeavours —endeavours that are none the less notable because bound up, as are all human achievements, with human errors.